Special Power Mac Issue

MAY 1994

Macworld

THE MACINTOSH® MAGAZINE
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Eclipse Pentium PCs

Power Mac Software Tested

15 Hot Performers

Power Mac Upgrade Options

Transform Your Mac into a Screamer



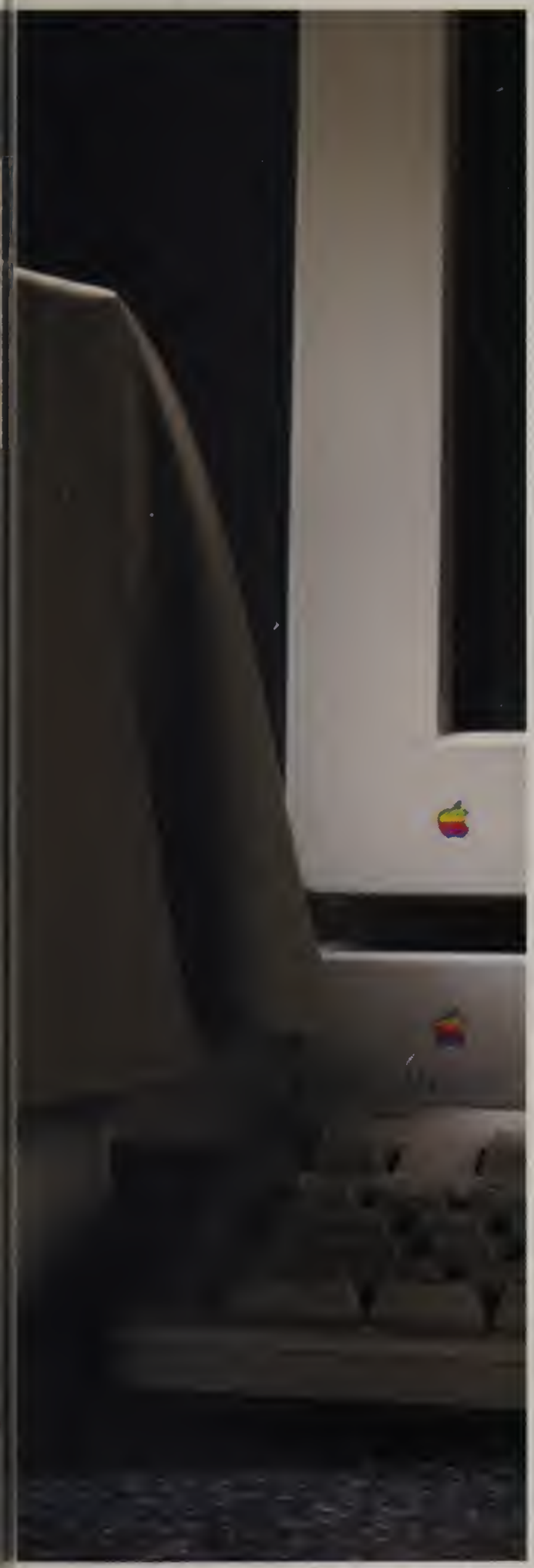
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IN STOCK. JUST WAIT TILL YOU SEE IT



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H THE MICROSOFT PROGRAMS NOW WITH OUR PERFORMANCE PACKAGE.



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In other words, you'll have a suite of full-featured business programs so well integrated that they act as if they were one program.

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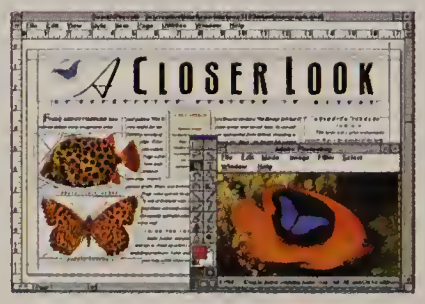


It's time to stop

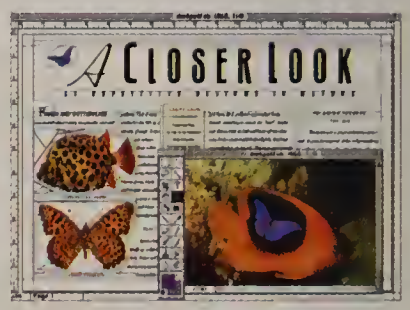
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You've reached a crossroads in computer technology. A point where choosing between a PowerPC*or a Pentium™ processor-based PC could be a difficult decision.

The PC is not what it used to be. Everything you want to do on a Macintosh,* you can just as easily do on a PC. And now, all of the most popular Mac applications are available for PCs, including those by Aldus, Microsoft, Adobe, Quark and Broderbund.



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and ask directions.

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Contents

MACWORLD THE MACINTOSH® MAGAZINE MAY 1994

MW LAB Power Mac Special Report

92 The Power Macintosh Arrives
BY LON POOLE AND GALEN GRUMAN Macworld Lab tests Apple's PowerPC machines for speed and compatibility. Here's what to expect.

96 Making AV Technology Mainstream
BY LON POOLE Audio/video features are second nature to the first generation of Power Macs.

98 Does PowerPC Beat Intel's Best CPU?
BY GALEN GRUMAN Pitting the PowerPC against the Pentium turns up surprising results.

102 Power Mac Software
BY GALEN GRUMAN Power Mac applications redefine speed. Macworld Lab tests 15 programs for native and emulated speed, with a preview of what's to come.

105 Are Power Macs Good Windows PCs?
BY GALEN GRUMAN Apple woos the PC crowd with Macs that do Windows.

110 PowerPC Upgrade Strategies
BY LON POOLE Macworld Lab tests hardware strategies for turning your 040 Mac into a Power Mac—for as little as $700.



Page 92



Page 96

News

35 MacBulletin

36 News Apple updates Newton • Low-end ink-jet printers from Apple, HP • Apple ports Mac OS to Unix, and more

43 PowerPC News Workgroup servers add PowerPC • Yarc ships 601-based 3-D accelerator, and more

45 New Products

Opinion

21 State of the Mac
BY ADRIAN MELLO When *not* to buy a Power Mac.

27 Letters

167 The Desktop Critic
BY DAVID POGUE The amazing Macintosh–"Star Trek" correlation.

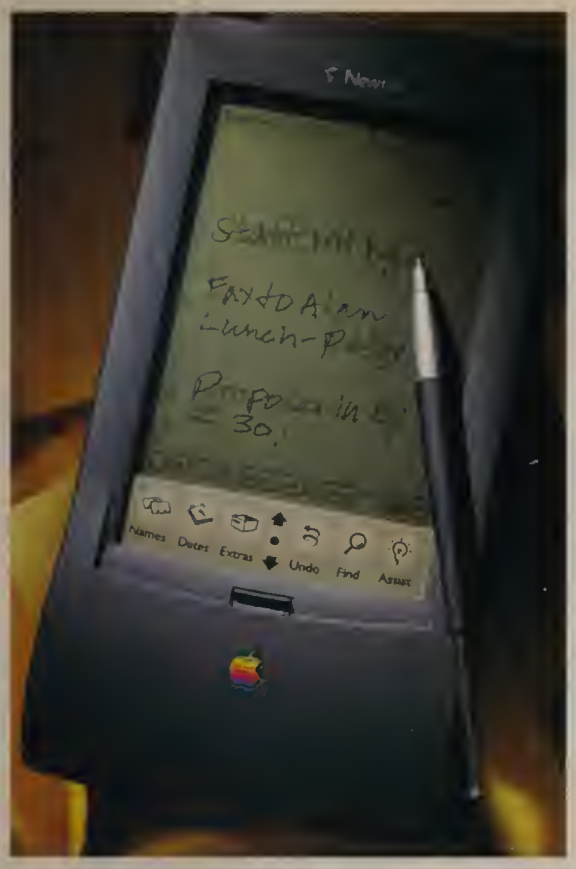
171 The Iconoclast
BY STEVEN LEVY The RISC generation.

173 Conspicuous Consumer
BY DEBORAH BRANSCUM The science of shopping for software via CD-ROM.

250 Wise Guy
BY GUY KAWASAKI Guy's ultimate multimedia machine.

ON THE COVER

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Page 36

Graphics

116 **News** VivaPress all-in-one application • Kodak Portfolio ready to roll • 600-dpi color thermal-wax printers, and more

120 **Expert Graphics**
BY CATHY ABES Graphics professionals share their secrets.

124 **Are You Breaking the Law?**
BY JAMES A. MARTIN Expert advice on how to keep creative inspiration from crossing the line into copyright infringement.

At Work

130 **News** Customizable electronic newspaper • TouchBase Pro and DateBook Pro tighten ties • Voice mail in your Mac, and more

133 **Working Smart**
BY JIM HEID The Tao of Tables.

138 **Smart Thinking**
BY JOSEPH SCHORR Proposals are important, but what about the idea behind them? Eight programs help you brainstorm, outline, and organize creatively.

147 **Quick Tips**
BY LON POOLE Tips, tricks, and shortcuts.

Networks

152 **News** LAN bottleneck breakthroughs • Cellular fax modem • Pocket Ethernet adapters, and more

155 **Take Control of Your Servers**
BY BILL WOODCOCK Network administration got you down? Five programs take the hassle out of managing a network, whether it's 1 server or 100.

161 **PowerBook Notes**
BY CARY LU Accessories for on-the-road computing.

Buyers' Tools

177 **Editors' Choice**
Top picks from our comparative articles.

179 **Star Ratings**
More than 350 product-review summaries.

189 **Streetwise Shopper**
Hardware and software bargains: discounts, bundles, upgrades.



Page 116

14 **How to Contact Macworld**

IDG

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Reviews

56 **Personal LaserWriter 320; HP LaserJet 4ML**
Laser printers

58 **AppleSearch 1.0**
Text archiving and retrieval

59 **MacroModel**
3-D modeling software

61 **DesignWorkshop 1.0**
3-D modeling software

63 **Paint Alchemy 1.0**
Plug-in graphics effects

63 **RAM Doubler 1.0.1**
RAM-enhancement software

65 **Kai's Power Tools 2.0a**
Photoshop plug-ins

67 **Timbuktu Pro**
Terminal emulation

67 **Map II 1.5**
Geographical information system

68 **Virex 5.0**
Virus-protection software

70 **Arrange 1.1**
Personal information database

70 **VIP-C 1.0.1**
Programming-code generator

73 **EtherDock; SCSI MicroDock**
Two PowerBook Duo docking stations

75 **Random House Unabridged Dictionary**
CD-ROM reference

75 **Wacom UD-1212R**
Graphics tablet

77 **Brother HJ-400**
Ink-jet printer

79 **CD-ROM ToolKit 1.0.5**
CD-ROM accelerator

79 **Atticus Vista 1.0**
Disk-cataloging utility

81 **Cypress PhonePro 1.2**
Telephony software

81 **EtherWave**
Ethernet transceiver

83 **4D First 1.0**
Entry-level relational database

83 **MacWrite Pro 1.5**
Word processor

84 **BaseMap 1.0.1**
Mapmaking program

84 **Open Sesame 1.02**
Finder automation utility

88 **Claire, The Personal Music Coach 1.0.1**
Musicianship program

89 **Smart Label Printer Pro**
Label printer

Semi-pro.



HP ScanJet II CX

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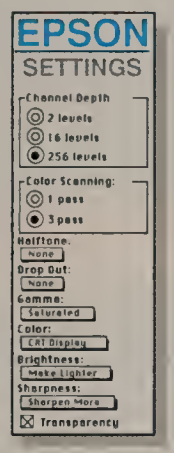


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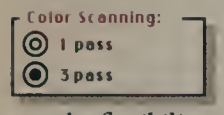


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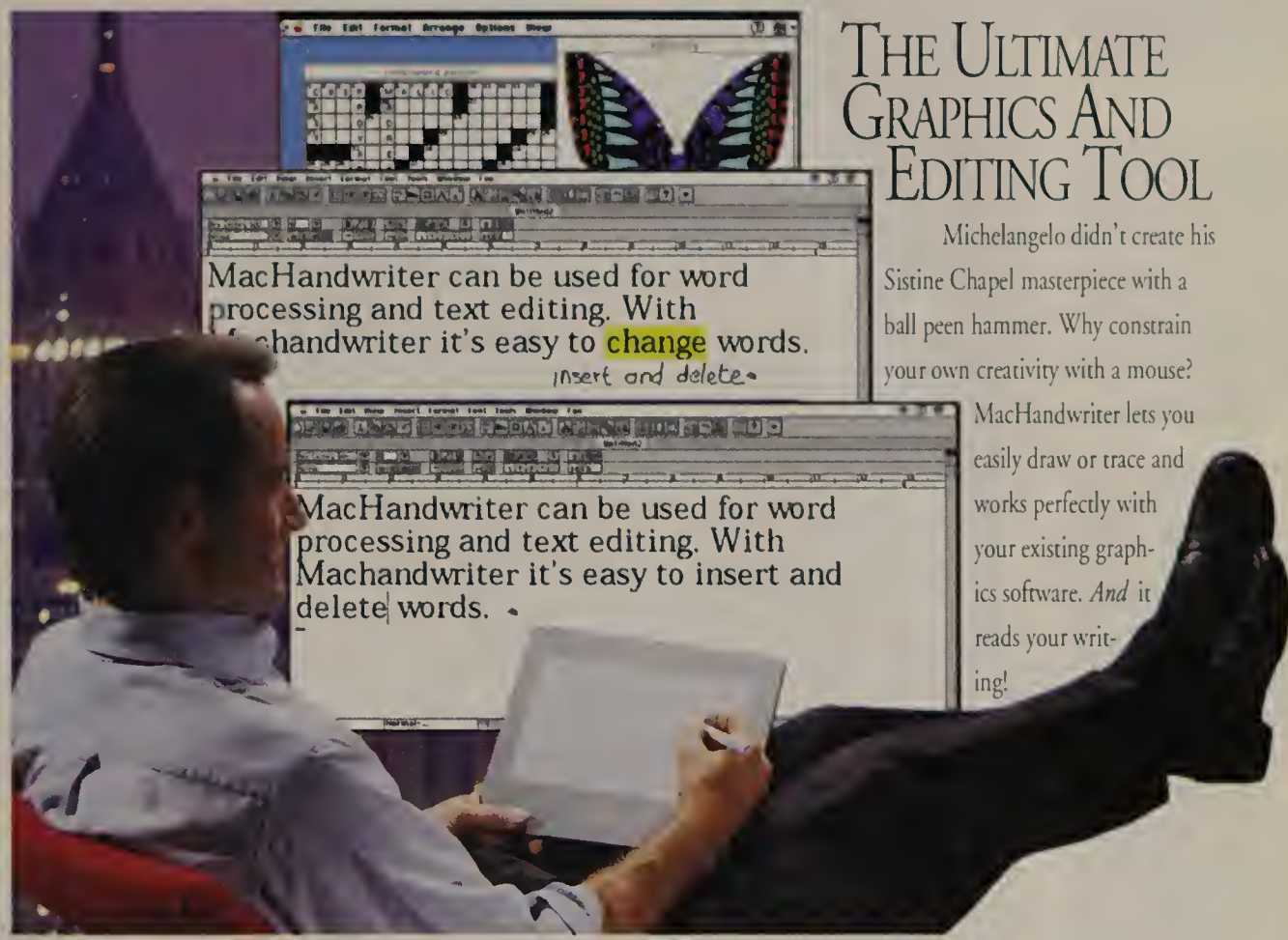
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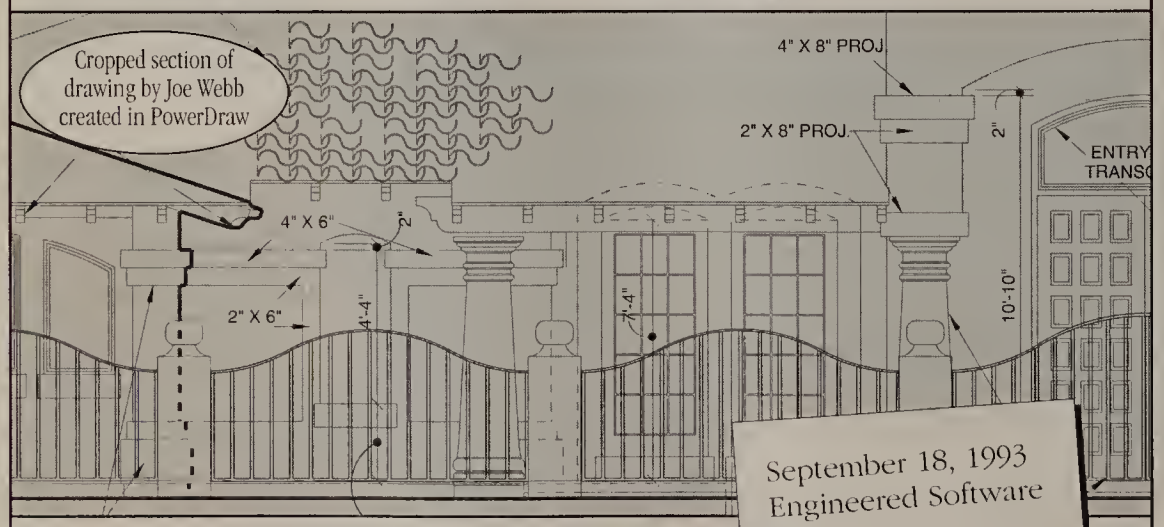
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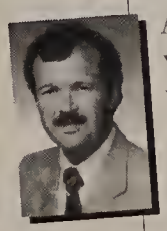


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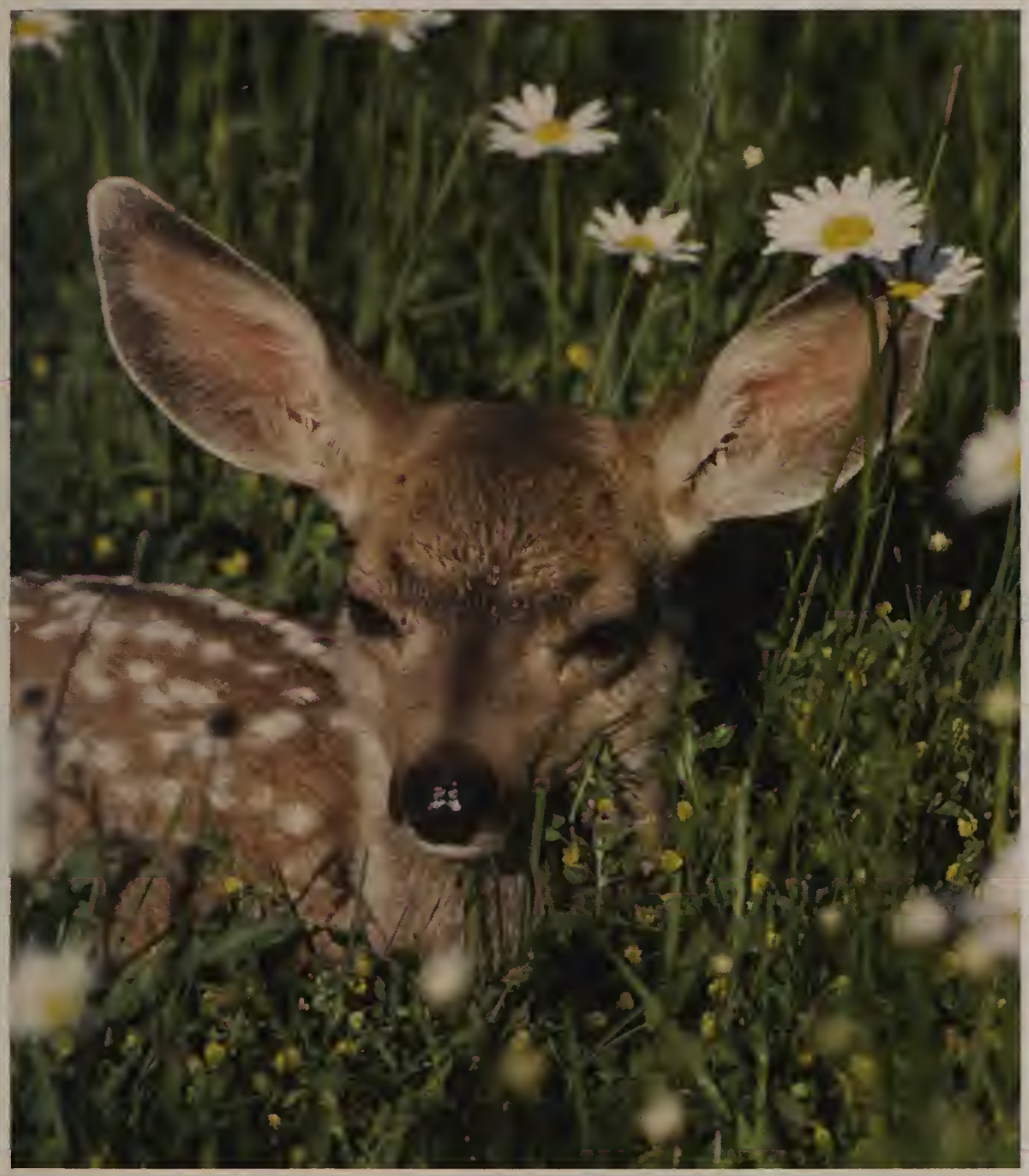
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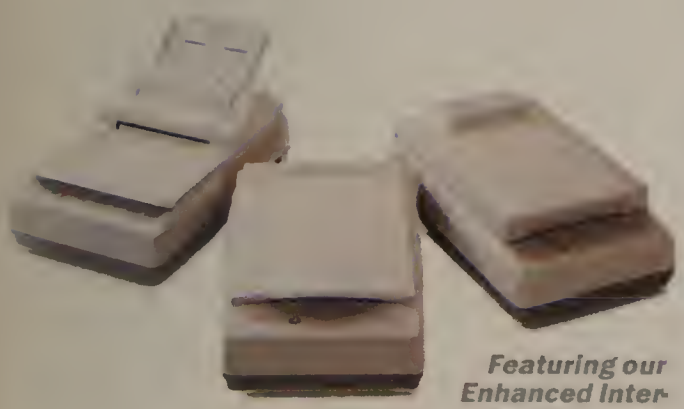
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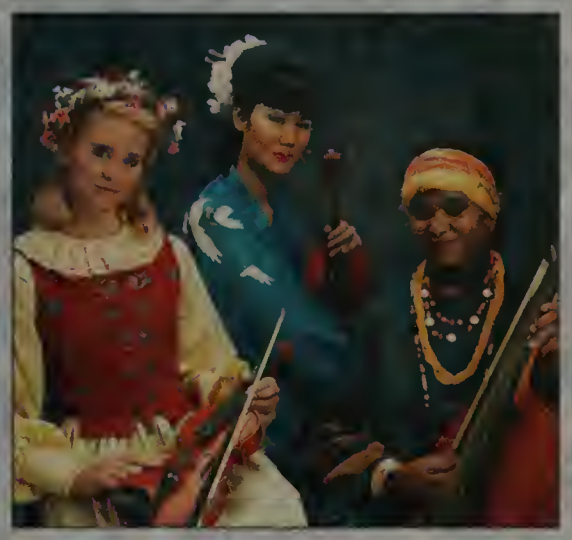
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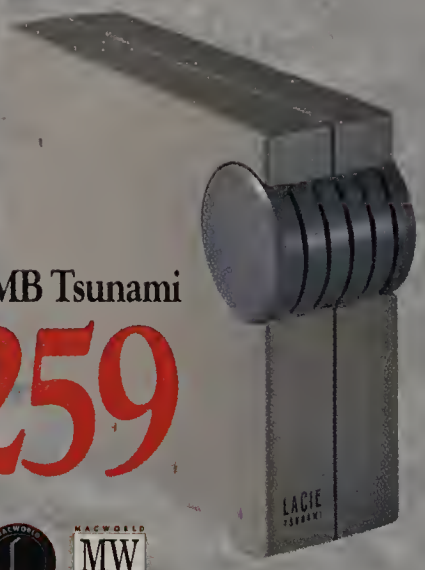
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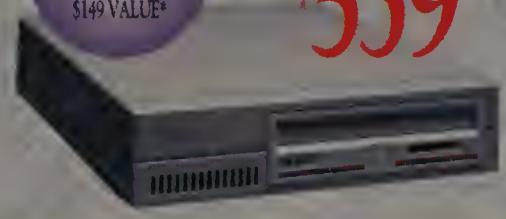
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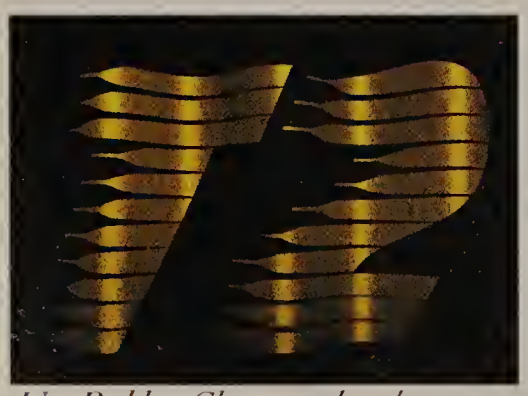
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BY ADRIAN MELLO

When Not to Buy a Power Mac

Sometimes, buying a Quadra makes more sense

THE INTRODUCTION OF MACINtoshes based on the PowerPC processor is the most important technological development in the evolution of the Macintosh since the Mac II debuted in 1987. As the Macintosh takes this tremendous step forward, many users are trying to figure out whether they should buy a Power Mac now, upgrade their current Mac, or wait. The considerations are complex, including everything from price and availability to what software and equipment you or your organization currently uses. (In this issue, Lon Poole and Galen Gruman go into great detail on the new Power Macs in a trio of features: "The Power Macintosh Arrives," "Power Mac Software," and "PowerPC Upgrade Strategies.")

Usually, you should avoid buying yesterday's technology, but sometimes being the last on your block makes more sense. It's true that you should eventually upgrade to a Power Mac, but timing is everything when buying computers.

Playing Software Catch-up

For the time being, some of you won't lose much by buying a Quadra instead of a Power Mac. In fact, if you already own a fast Mac (a IIfx or faster), you may lose something by converting to a Power Mac.

First, although a lot of native PowerPC software is available, the selection is a mixed bag. Users who rely on flagship packages such as Microsoft Excel, Microsoft Word, Claris FileMaker Pro, Adobe Photoshop, or QuarkXPress will not be able to get native versions for months.

Second, a Power Mac actually runs 680X0 programs slower than a Quadra or Centris. Depending on what software you use, you will get about two-thirds to three-quarters the performance on a Power Mac as you do on an equivalent Quadra or Centris—basically comparable to a Mac IIci to Centris 610.

This situation reminds me somewhat of the introduction of the Quadra 700 and 900, the first Macs using the 68040 CPU. Many programs had to be updated to deal with the 040, and in some cases it took several months to work out all the kinks. Just when developers had resolved these problems, Apple introduced a faster version of the Quadra 900—the Quadra 950. Many 900 owners wished they had simply waited a bit longer.

Who knows if this scenario might not be repeated? It probably will. At the rate Apple is updating Macs, a few months is a very long time in the life cycle of a particular model. And Apple has made it



clear that a new generation of Power Macs with more-significant design differences, such as a new peripheral-expansion bus, is coming in the next 9 to 12 months. It's unlikely that Apple will have Power Macs with the faster PowerPC 604 CPU available for some time, but it is easily conceivable that higher-clock-rate 601 models could be offered before then.

A Quadra is likely not only to provide quicker performance for current software but also to leave you the option of upgrading to a faster Power Mac when the software is ready and perhaps when other capabilities are added.

If you own a Mac using a 68030 or earlier CPU, you'll have little or no performance loss when you move to a Power Mac. You will probably even get a performance gain if you now use, say, a Classic or LC II. Owners of the IIci, IIvx, and IIfx fall into the gray area where Power Mac performance may be slightly less than they're used to. But if you have a Centris or Quadra, waiting is probably a better option. Likewise, if your company needs to add ten Macs to a new field office, and Quadras are the standard Mac, go ahead with more Quadras.

Supply and Demand

In any case, you may have a difficult time getting Power Macs for a while. Anticipation for the Power Macs has built steadily for several months, resulting in a lot of pent-up demand. Apple has gotten much better at forecasting demand, but despite its best efforts to build up a supply, I believe that Apple is likely to have underestimated again.

Sales of higher-end Quadras, such as the 840AV and the 650, have slowed dramatically in the last several months, apparently because users have been waiting for the Power Macs. This may also mean that there is more pent-up demand for higher-end Power Mac models like the 7100 and 8100. As a result, the Power Macs (particularly the higher-end machines) might be hard to come by, and dealers might charge more than the Apple estimated price, which is fairly low. (Some dealers have complained that they can't afford to charge their customers as little as Apple's published estimates.)

continues

That demand will in turn make Quadra prices drop as dealers try to clear them out—you're likely to see some terrific bargains. One lesson from the last couple of years is that Mac prices are fluid. With the Power Mac introduction, I won't be surprised to see Quadras priced for $1000 less than their Power Mac equivalents.

All these trends point to one conclusion. If you need a Mac right away and you'd have to wait a long time for a Power Mac or pay a lot more for one, you should definitely consider a Quadra. The key issue is price: if Quadra prices drop and Power Mac prices rise, a Quadra may be the best choice.

When to Buy a Quadra

Here's a guideline for making a decision. If the price of a new Quadra plus a Power Mac motherboard upgrade is no more than 10 to 20 percent higher than the price of a new Power Mac system, you should seriously consider buying the Quadra. You'll pay a little more but suffer no performance penalty.

Consider a hypothetical example to see how this might work (and keep in mind that actual prices will vary). In your daily work, you spend a lot of time creating financial reports. You write the analysis in Word, crunch the numbers in Excel, and lay out all this information in QuarkXPress. Say you can buy a Power Mac 6100 for $1800 (not including monitor or keyboard) but you can buy a similarly configured Quadra 610 for $1100. A motherboard upgrade is likely to cost about $1000 now and perhaps slightly less later. You should buy the Quadra now and upgrade to a Power Mac later.

In this example, the Quadra 610 will provide you with better performance for several months while developers introduce their native PowerPC software versions and work the kinks out of them. Another way to look at it is that you will pay $300 later so that you can run your software more quickly and without headache for several months.

It does *not* make sense in some situations to buy an AV Quadra and upgrade later to an AV Power Mac. If you use the video input and output features, the cost of buying an AV Quadra now and an AV Power Mac motherboard replacement later is simply too high. A PowerPC-based accelerator board is out of the question, since neither DayStar's nor Apple's will work in an AV Quadra. But if you don't use the video features, getting an AV Quadra now makes more sense, since the audio and telephony features of AV Quadras are included in the standard Power Macs and thus won't cost extra when you buy a Power Mac motherboard for the AV Quadra.

When to Buy a Power Mac

In many cases, buying a Power Mac makes the most sense. A Power Mac is the ticket if you can take advantage of the fast new software and you can live with the speed of emulated applications until they are updated. A Power Mac is also the way to go if you are trading up from an 030 or earlier Mac, since the speed of even emulated 680X0 applications is faster than you are now experiencing.

At the start of the Power Mac era, it's ironic that sticking with 040 technology, at least for a while, may be a better strategy for some buyers than jumping on the Power Mac bandwagon. However, until the Power Macs settle in, the wisest course is to consider *when* a Power Mac or a Quadra is the best choice, rather than assuming the Power Mac will meet your immediate needs. Timing is everything. m

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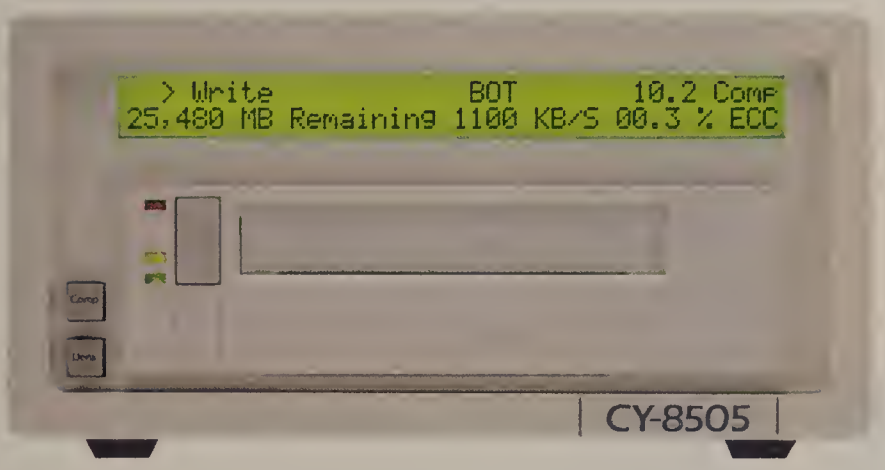
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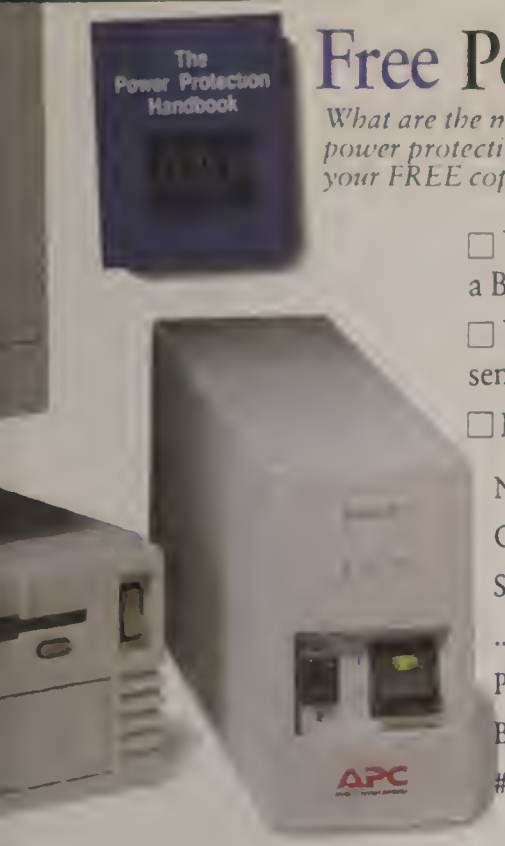
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Andrew Wargo, Manager at Baxter Land Company, tried two other brands before Back-UPS. "One lasted a few days, a second one went up in smoke after 48 hours, a third lasted less than 24 hours! I then bought my Back-UPS for less than half of what I had paid for the others. We've purchased three more Back-UPS and for the past 14 months they've been just hummin' away on the same power line that was eating the other brands alive!"

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Letters

Anniversary Accolades and Memories

I THOROUGHLY ENJOYED *MACWORLD*'S Special Tenth Anniversary Issue articles on the history of Apple and the Macintosh (February 1994). As a young patent attorney working as outside counsel to Apple starting in 1981, I wrote many of the fundamental patents for the Lisa and the first Macs. As the original Mac innovators described their projects and methods, I remember thinking, How in the world am I going to protect this?

Computer patent law was like the Wild West. In preparing the original patent application for the first Apple mouse, I wrote claims covering the use of the mouse by the user, and the resulting action of the computer; this became known as the Mouse Pull-Down patent for the Mac interface. It caused quite a stir among lawyers and the technical community to see that Apple actually got a patent on a feature of the user interface.

I will always remember those years on Bandley Drive. Every day I have the satisfaction of using those innovations (and patents), even as I type this letter on my Macintosh Centris 650.

Jeffrey J. Blatt
Los Angeles, California

THANKS FOR TWO VERY INTERESTing pieces in your February issue regarding the Mac's failure to live up to its potential: "Macintosh Mystique" and "1984 Redux" (*Wise Guy*).

However, I think you missed the irony of an important point. While PC-compatible manufacturers were competing through lower prices, better service, and shared architecture, Apple was gouging purchasers, scorning customer support, and being secretive with its technology. The ironic part is that while the Mac appealed to the "creative freethinkers" and "agents of change," the company that produced it was being run like an old-fashioned, fat-cat, capitalist



business. Short-run profit and stock price were much more important than they should have been.

Mitchell Ostrom
Los Angeles, California

CONGRATULATIONS ON YOUR COMprehensive issue about the history and future of the Macintosh—it's probably the best issue you folks have ever done. Kudos to the researchers and interviewers who helped paint a clear picture.

Alex Johnson
via America Online

IT'S ABOUT TIME SOMEONE APPLAUDed your art director and staff, specifically on the images done by Hans Neleman that appeared in the February issue ("Macintosh Innovations," "PowerPC Preview," "Macintosh Mystique," and the cover). Amazing imagery, even if not completely desktop published.

Doug Moench
Fort Collins, Colorado

THIS LETTER IS A HATS-OFF TO GUY Kawasaki for his "1984 Redux" in the February *Macworld*. Worth noting is the quote, "We lived under [the misconception that] every Macintosh programmer would be as good as Andy Hertzfeld."

Only someone with Guy's experience can remind us that the original Macintosh development team were good at what they did, and they're tough acts to follow.

Theresa Marie Rhyne
Research Triangle Park, North Carolina

I WISH TO CLEAR UP A SLIGHT ERROR regarding FileMaker in the time line "Macintosh Milestones: 1983–1994" ("Macintosh Innovations," February 1994). I was the author of FileMaker, and for the record, FileMaker was released by Nashoba Systems in 1986. In 1988, Nashoba was sold to Claris Corporation. My Nashoba cofounder, Alan Albert, and I founded Attain Corporation in 1990.

This mass of dates, companies, and products was condensed to "[1986] . . . Attain releases FileMaker," which isn't true—Attain wasn't even founded until 1990! Since 1988, FileMaker has been developed and marketed by Claris.

Dan Chadwick
President
Attain Corporation
Somerville, Massachusetts

"Mass of dates and companies" doesn't begin to describe the FileMaker story. According to Mr. Chadwick, FileMaker began life as the Mac incarnation of a PC file manager called Nutshell that Nashoba wrote for Leading Edge. Nashoba licensed the publishing rights for the Mac software to Forethought, who named it "FileMaker." Microsoft bought Forethought, and the rights to FileMaker reverted to Nashoba. Nashoba released FileMaker Plus and FileMaker 4, the company was sold to Claris, and Claris republished the program as FileMaker II.—Ed.

PowerPC: Not Fast Enough

IN YOUR MARCH ARTICLE "CPU BOOSTers" you discussed the speed improvements that changing the clock crystal on the logic board will have. Near the end of

continues

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CORRECTIONS

- *In the March review of the Quadra 605, we incorrectly identified the machine's 25-pin SCSI connector as 50-pin. Also, The Quadra 610 CPU is a 68LC040, not a full 68040.*
- *In the March* New Products *section, APS's phone and fax numbers should have been 816/483-6100 and 816/483-3077, respectively.*
- *In March* PowerBook Notes, *MicMac dictation-recording software from Nirvana Research was inadvertently referred to as MicMan.*
- *In the table "What You Can Manage with SNMP" in "SNMP Revealed" (February 1994), Compatible Systems' phone numbers should have been 303/444-9532 and 800/356-0283.*

the article, it was stated that these boosters can be removed later on, if you want to upgrade to PowerPC, for instance.

The PowerPC (PPC) PDS upgrade card uses a method called clock doubling, which runs the PPC 601 at twice the speed of the system bus. If I increased the speed of the system bus by changing the clock crystal, why would I want to remove it for the PPC upgrade card? Instead of running my Centris 610 with the PPC card at 40MHz, I would theoretically run it at 57.2MHz. Am I correct?

Russ Homsy
Natick, Massachusetts

Macworld Lab tested the Power Mac upgrade cards on a CPU-boosted Quadra (see "PowerPC Upgrade Strategies," in this issue). The card did double the boosted CPU speed, but the system then began crashing when trying to run at that speed.—Ed.

Databases That Work, Companies That Don't

CHARLES SEITER'S ARTICLE "DATAbases That Work" (January 1994) was a good update on the state of multiuser relational databases for the Mac. But I feel that one very important aspect was left out of the reviews: the quality and responsiveness of the vendors' technical-support departments. The availability of timely and accurate technical support can mean the difference between happy database developers and users, and everyone involved tearing their hair out.

I have been developing databases in 4th Dimension since version 1.0.6. One thing that has remained constant over the years is ACI US's cavalier attitude toward technical support. Recently, just getting them to answer the phone has been nearly impossible. Although 4th Dimension is a capable tool, it is a very complex piece of software. And the more complex a system is, the less reliable it tends to be. The bugs and idiosyncrasies would be bearable if ACI US's technical-support group were as good as the software.

Victor Celarier
Bellevue, Washington

My experience with phone support for the main relational databases has been that Omnis and Helix are generally excellent and that 4D support tends to follow your description. Right now Microsoft is trying to implement a new tech-support system for FoxPro for the Mac—we'll have to wait to see how it works out.—Charles Seiter

Clean Track-Record

IN THE MARCH STORY "MAINSTREAM Storage," Tim Warner wrote that APS Technologies "fell down on tech support for this article, but historically has provided very good support."

MacProducts USA also received a "poor" rating in that article, but without a similar ameliorating comment in the text. I searched back through tech-support ratings in previous issues and found three articles that MacProducts appeared in; in all three, we were rated either "very good" or "excellent."

MacProducts has a history of top-notch technical support—a fact that has frequently appeared in *Macworld*'s pages.

Maurie Beasley
Public Relations Director
MacProducts USA
Austin, Texas

Sinner Becomes Saint

DEBORAH BRANSCUM, IN "SAINTS and Sinners Revisited" (*Conspicuous Consumer*, February 1994), harnessed us with horns because of some warranty woes we ran into a while ago. We launched a lifetime-warranty program to cover our line of hard drives and advertised this for two months in *Macworld*. But because our suppliers could not comply with our new program, we had to drop the lifetime-warranty policy, and we immediately pulled this information from our ads. However, for the two months that the lifetime-warranty ads ran, every hard drive sold came with that policy. In other words, Mirror has honored and will continue to honor the lifetime warranties of those customers who purchased drives while the warranty was advertised.

continues

June 14, 1963.
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Circle 73 on reader service card

We take great pride in providing exemplary customer service, and we trust that you will recognize our efforts to put the customer first. If there is any way you could de-horn Mirror, we would greatly appreciate it.

Mike Evangelist
Mirror Technologies
Saint Paul, Minnesota

Readers should consider Mirror Technologies not only "de-horned" but also awarded sainthood. After Mr. Evangelist wrote to us, MacUSA purchased Mirror's product line. MacUSA's president, Joel Ronning, has promised that his company will honor all Mirror warranties, including the aforementioned lifetime warranties.—Ed.

Formal Protest

WELL, I SUPPOSE THERE'S NO feeling of satisfaction so great as the one you get when you insult a whole class of people with an offhand, flip (and erroneous) remark. David Pogue has shown a lack of sensitivity and a misunderstanding of TrueForm by Adobe Systems, which he reported on in the February issue (*The Desktop Critic*). The class of people offended by his remarks are the thousands in the forms-analysis and forms-design industry. Good grief, who do you think designed the forms Adobe meant to be scanned in? Righto!

TrueForm failed, not because there are only "17 people in the forms design industry," but because of Apple's failure to position large volumes of networked Macs in office environments. I'll bet if they reintroduced it for Windows, it would be a hit.

Harris Ruben
Berkeley Heights, New Jersey

THE DESKTOP CRITIC'S COLUMN about products that survive and those that don't cites Adobe Systems's TrueForm as an example of software that failed because the market failed. Not so. The market did not fail; it has been waiting and watching.

Shana Corporation created the first Macintosh forms package. Our current product, Informed Foundation, is a suite that allows a user to handle a form entirely electronically from initial design to final storage in a database. Microsoft, Lotus, and WordPerfect, to name a few, are now also entering the market. You'd better believe that there's a market out there, and it's very much alive.

Don Murphy
President
Shana Corporation
Edmonton, Alberta, Canada

Actually, I'm not the one who says the forms market (or even the forms-filling-out market) was small and unlucrative in the '80s—it's Adobe and Claris, who axed their forms programs for this reason. (It's not about a lack of Macintosh offices—if it were, then Mac word processors, spreadsheets, and graphics programs would have died along with TrueForm.) Even so, I certainly meant no insult to the fine, if few, forms fans.—David Pogue

Push Which Button?

THE "ARTIST'S RENDITION" OF A hypothetical version 15 of Microsoft Word made me laugh (*The Desktop Critic*, February 1994). Whose creation was it? I couldn't find a credit. It was of particular interest to me because I recently sat down to teach my mother the basics of the Macintosh, including "that typing program," as she calls it. I explained Word 5.1 feature by feature, beginning with the ruler, then the ribbon, then the strip, then the band, then the beam, then the . . . .

After I had finished explaining all those buttons (she took careful notes), I opened up the menus to show her what else there was.

"Didn't we already do that?" she asked when I described formatting from the menu.

"Yes, but this is another way to do the same thing."

"Oh."

"And then there are the keyboard shortcuts," I explained, making it three ways to do some of the most common things. My mother paused, checked her notebook, looked at me, and said, "I just want to type."

Graham Segroves
via Internet

Maybe Mr. Segroves's mom should emulate a client of mine. This woman not only hid Word's tool bars, she also discovered she could remove superfluous commands from Word's menus. By the time she was done, the only menu commands left standing were Bold, Save, and Print. As for the Word 15 illustration: my friend Steve Alper, a composer and Mac guru in New York, dreamed up the joke with me and did the actual artwork.—David Pogue **m**

Letters should be sent to *Letters, Macworld,* 501 Second St., San Francisco, CA 94107; via fax, 415/442-0766; or electronically to CompuServe (70370,702), MCI Mail (294-8078), America Online (Macworld), or AppleLink (Macworld1), or via Internet (70370.702@compuserve.com). Include return address and daytime phone number. Due to the high volume of mail received, we can't respond personally to each letter. We reserve the right to edit all letters. All published letters become the property of *Macworld.*



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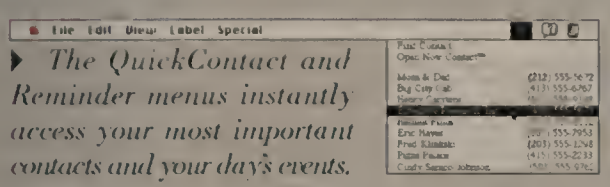
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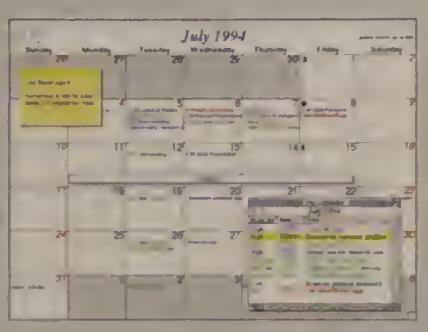
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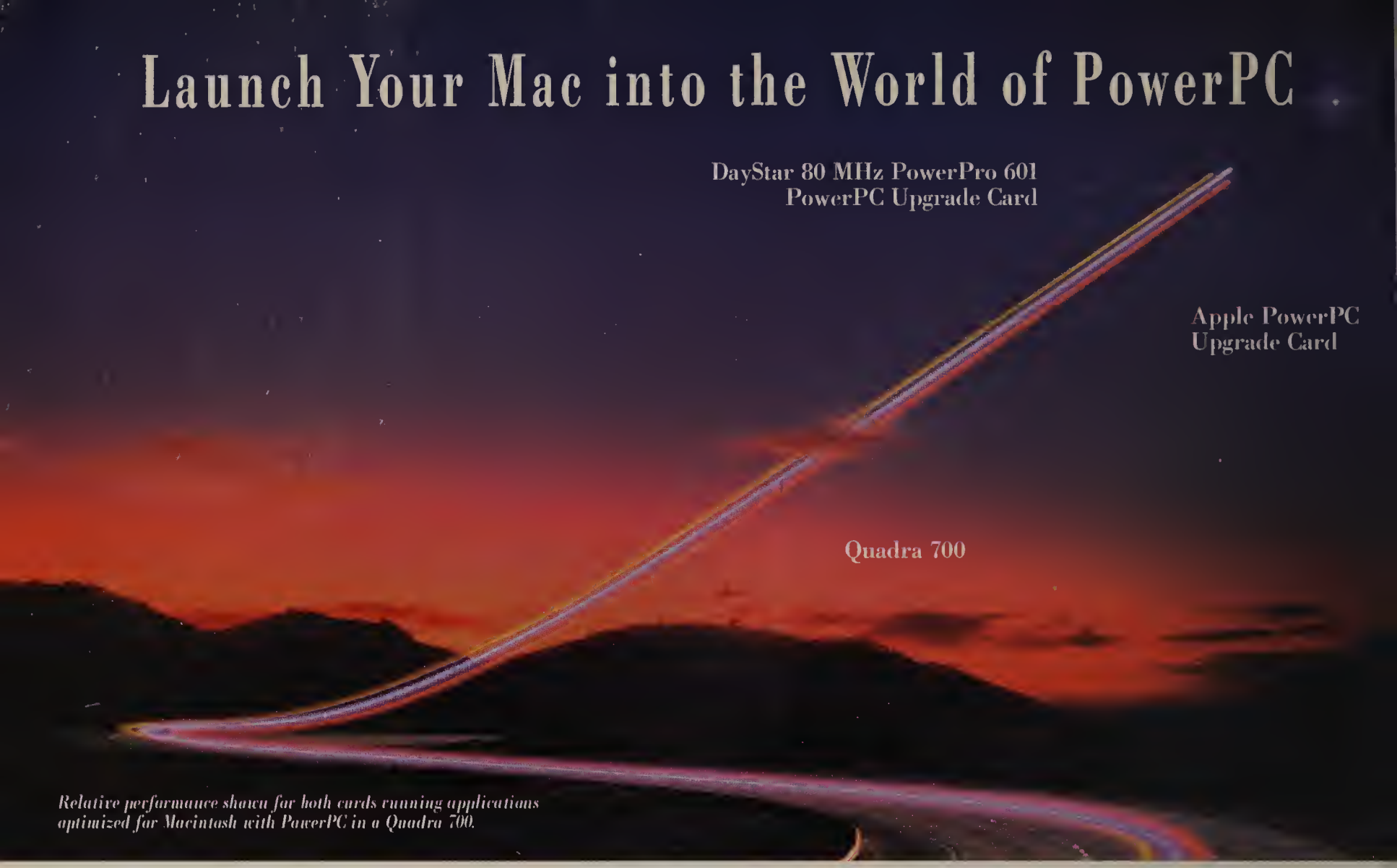
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Launch Your Mac into the World of PowerPC



Relative performance shown for both cards running applications optimized for Macintosh with PowerPC in a Quadra 700.

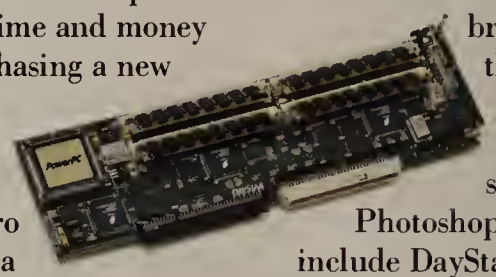
The Quick and Easy Way to No Compromise Speed

Features	Apple PowerPC Upgrade Card	DayStar PowerPro 601
Average Street Price–		
80 MHz	n/a	$1999
66 MHz	$699*	$1499
Apple System software	Yes	Yes
Genuine Apple® ROMS	Yes	Yes
RISC processor	PowerPC 601	PowerPC 601
Restart as a 68040 Mac	Yes	Yes
Maximum operating speed–		
Centris 650	50 MHz	80 MHz
Quadra 700 and 900	50 MHz	80 MHz
Quadra 650, 800 and 950	66 MHz	80 MHz
Memory expansion	0 MB	128 MB†
Maximum System memory–		
Quadra 700	68 MB	196 MB
Centris 650	136 MB	264 MB
Quadra 650, 800	136 MB	264 MB
Quadra 900, 950	256 MB	384 MB
Cache size available	1 MB	1 MB†
Direct access to 64-bit memory	No	Yes
Upgradable to next generation PowerPC	No	Yes
Graphics utilities included–		
Native Photoshop filters	No	Yes
Photoshop scripting	No	Yes
Color management	No	Yes

* Speed varies between 40 MHz and 66 MHz depending upon Macintosh model. † Optional. Not required for operation.

DayStar's PowerPC upgrade for the Quadra 650, 700, 800, 900, 950 and Centris 650.

DayStar designed the PowerPro 601 for the graphics professional seeking the maximum in PowerPC performance. You save time and money compared to purchasing a new Power Macintosh system. And, if emulation is too slow, the PowerPro lets you restart as a 68040 based Macintosh.



Developed in cooperation with Apple Computer, the PowerPro 601 has actual PowerPC ROM chips. So, you get the same functionality and compatibility as Apple's own Power Macintosh solutions.

Faster than Apple's upgrade card, the PowerPro 601 also offers up to 128 MB of additional memory expansion that combines with your motherboard memory.

For Photoshop users, we also include DayStar's revolutionary PhotoMatic scripting utility, and a broad family of filters that run Adobe Photoshop 2.5.1 at full PowerPC speeds! For Quark and Photoshop users, we also include DayStar's ColorMatch color management solution. That's over $600 of software, free!

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Circle 7 on reader service card

LATE-BREAKING NEWS

MacBulletin

Apple's System Software Plans Apple recently outlined its system software strategy for the next several years, saying it would move from today's passive interface to active assistance, from network communications to collaboration, from monolithic applications to component software (see OpenDoc item below), and of course, from CISC (680X0) to RISC microprocessors (PowerPC). The main points:

• Apple expects to ship System 7.5 this summer both for 680X0 and for PowerPC systems. System 7.5 will include AppleGuide (the first instance of active assistance), a scriptable Finder, drag and drop, the long-overdue QuickDraw GX, multithreading, PowerTalk, MacTCP, file synchronization and management, and support for translating DOS and Windows files.

• Copland ("System 8"), a future operating system, may arrive in 1995. Copland will offer active assistance, multitasking, and memory protection; and will work with a "new I/O architecture," probably a reference to the PCI bus and/or the FireWire serial bus.

• Gershwin, an operating system projected for 1996, will include preemptive multitasking; intelligent assistance; a microkernel architecture; and advanced graphics with cut, copy, and paste.

• OpenDoc, the document-centered component operating environment that may be the future of the Mac and other computers, will take a major step forward when software-development kits ship this fall from Component Integration Laboratories.

Canon to Make PowerPC Systems Canon announced that PowerHouse Systems, a Silicon Valley start-up, will build computers using PowerPC chips. PowerHouse will sell the computers to other systems vendors. Although Apple CEO Michael Spindler has said that Apple would license the Macintosh Operating System to (unnamed) companies that will use the PowerPC chip, PowerHouse has said only that its machines would comply with the PReP spec (which is not yet Mac-compatible) and would run operating systems including Windows NT, Workplace OS, AIX, Solaris, Taligent, and "others." Sources close to Apple and PowerHouse said they expect PReP to be Mac-compatible within a year.

Premiere 4.0 Adobe Systems' Premiere 4.0, the latest version of the digital-video-editing software, includes a trim window for precise rolling edits, a floating preview window, filters that vary over time, support for true 29.97-frames-per-second playback, improved audio handling, and instant previews of projects under construction. Due on May 25 in fat-binary format (PowerPC- and 680X0-compatible) on CD-ROM only, it will list for $795. Upgrades from Premiere 3.0 will be $79. Adobe, 415/961-4400.

Yet Again More Price Cuts Apple has dropped the prices of the PowerBook 180 4/120, Duo 250 4/200 and 12/200, and Duo 270c 4/240 and 12/240 by 9 to 14 percent. The smallest percentage cut was on the Duo 270c 12/240 with Express modem (now $3299), and the largest was on the PowerBook Duo 250 4/200, now $1959 without a modem.

Resolve Fails Claris has thrown in the towel for its Resolve spreadsheet, saying that the product's sales failed to justify further development. The company will offer support until March 31, 1995, and is selling its ClarisWorks suite of programs (including a spreadsheet) to current Resolve owners for $29.

Software Giants Merge Software publisher Electronic Arts has announced that, subject to stockholder and federal approval, the company will purchase rival Brøderbund in a stock swap. m

News

EDITED BY TOM MORAN

IN THIS ISSUE

p. 37 Apple and HP Color Printers **p. 37** Mac on Unix **p. 38** 68060 Accelerators

p. 39 Radius QuickDraw Accelerator **p. 39** Apple's 20-Inch Monitor

p. 40 Compression Utilities **p. 40** 270MB SyQuest Drive **p. 40** Wireless Communicator

Apple Refines the Newton

After the hype surrounding Apple's Newton personal digital assistant (PDA) died down, the 80,000 pioneers who bought one were left with a promising device that offered mediocre handwriting recognition and showed the signs of being the first product in a new category. But if the original Newton MessagePad offered a lot of sizzle, the new MessagePad 110 delivers some steak.

The MessagePad 110 (about $599) is not the next-generation Newton, but it is a better MessagePad. It refines the core Newton capabilities by providing better handwriting recognition, additional RAM, a more ergonomic design, and more.

The most significant change is the addition of deferred handwriting recognition, which allows you to take notes, save them as "digital ink" (a bitmapped image), and then go back and convert that image to text when convenient. With the original MessagePad, if you don't tell it to immediately translate your handwriting, your data can never enter the more useful world of ASCII text.



MARK JOHANN

Apple's Newton MessagePad 110 includes new ROM for better handwriting recognition and a redesigned case that's easier to hold and incorporates a fold-back screen cover (not visible).

Another improvement to the ROM is the addition of letter-by-letter recognition, useful for reading words not in the Newton word list—proper names, for example.

Newtons use their RAM for both active memory and data storage; the original MessagePad had 640K, leaving about 160K of work space. The 110 offers 1MB of RAM with about 480K available.

To make it easier to hold, the 110 is a little longer and less wide than the original MessagePad. The 110 also has a new stylus. Unlike the flat plastic stylus of the original MessagePad, the new one is round and slides into a compartment in the right-hand corner above the screen.

There are several ways to get information to and from a MessagePad, but beaming data with its infrared transceiver is by far the coolest. The 110 beams data at a warp speed of 38.4 Kbps, versus the

modemlike 9600-bps speed of the original MessagePad.

The 110 uses four AA alkaline batteries: Apple estimates the 110's battery life will be twice as long as that of an original Newton using AAA batteries, and four times longer than with NiCad batteries. For intermittent use, the AA batteries last up to four weeks. For continuous use, expect up to 12 hours. Apple will also offer a new caddy-style charger (less than $100) that restores NiCads in about two hours.

Apple will offer a more affordable MessagePad 100 (about $499) that uses the same case as the original Newton, but features the new ROM. You can upgrade an original MessagePad to the new ROM for $99.

The Newton Connection Kit 2.0 (about $99) is a new version that provides translators for popular applications, as well as comma- and tab-delimited text. Apple scheduled both the 110 and the kit for shipment in early March. The Windows version of the connection kit was scheduled to ship this spring.

The Newton's future centers around additional new technology, but for now, users will be pleased to find a MessagePad that simply works better.—DAN MUSE



SEAN SULLIVAN

The Hewlett-Packard DeskWriter 560C (left) and the Apple Color StyleWriter Pro are both color ink-jet printers that offer improved resolution.

Battle over Color Printers

HUE AND CRY

With color printers increasingly in demand for use in homes and offices, both Apple and Hewlett-Packard have new ink-jets that can produce color or monochrome output at higher resolutions than before.

The Apple Color StyleWriter Pro prints up to 2 pages per minute in monochrome, or 1 page every two minutes in color, both at 360 dpi. It uses a new Canon print engine, 64 TrueType fonts, a ColorShare driver that supports printer sharing, and a 100-sheet paper feeder that can hold 15 envelopes.

The Apple printer's ink cartridges are clear plastic so you can judge how much ink is left, and the cartridges are all separate so you don't have to throw out ink if one color runs out. The company estimates that a page of black text with 5 percent coverage will cost 2.4 cents, and that a color page with 30 percent coverage will cost 15 cents. Apple has also included its ColorSync color-matching software.

The Color StyleWriter Pro can operate in three modes—photographic, business graphics, and spot color—and can print on letter, legal-, and A4-size plain paper, or on transparencies. Scheduled to ship in late March, the Energy Star–compliant printer will have a direct price somewhere between $649 and $749.

With its DeskWriter 560C, Hewlett-Packard offers even higher resolution (in one direction): 600 by 300 dpi. Replacing the DeskJet 550C, the 560C produces 3 pages per minute in monochrome, or about 1 color page in four minutes (seven minutes in best mode), according to HP. The 560C includes 35 TrueType fonts; HP's ColorSmart color-rendering software; improved ink-jet cartridges to reduce misting; and an automatic sheet-feeder that holds 100 sheets of paper, 50 transparencies, or 20 envelopes.

Only the black-ink cartridge is separate on the HP printer, so if you're printing a lot of one color (other than black), you may have to throw away some ink. HP estimates an average monochrome page will cost 2.5 cents. At press time, HP did not have an estimate for the cost of an average color page. The 560C also accepts letter-, legal-, and A4-size paper and standard transparencies. The 560C, also Energy Star–compliant, began shipping March 3 at a list price of $719. The new HP color printer will eventually replace the existing DeskWriter 550C, which was reduced in price to $599.

HP also introduced the $365 DeskWriter 520, a monochrome ink-jet printer that will replace the DeskWriter 510. It also shipped March 3. HP will also offer a $249, software-only upgrade for the 560C. Apple, 408/996-1010, 800/ 776-2333; HP, 800/752-0900.—T.M.

Apple Ports Mac OS to Unix

FOR HP AND SUN MACHINES

With Macintosh Application Environment 1.0 (MAE), Apple Computer has for the first time ported the Macintosh Operating System and interface to another hardware platform. Expected to ship in May, the $549 MAE will run on Hewlett-Packard

continues

In Brief

Apple Sells Money

Money magazine and Apple have announced the Performa 560 Money Magazine Edition. The bundle combines a Performa 560 with WealthBuilder from *Money* magazine, Quicken, MacInTax, ClarisWorks, Datebook Pro, Touchbase Pro, and other software. Apple will sell the package directly for $2199; selected Circuit City stores will also offer the package. Apple, 408/996-1010, 800/351-6111.

Aldus Sells SuperCard

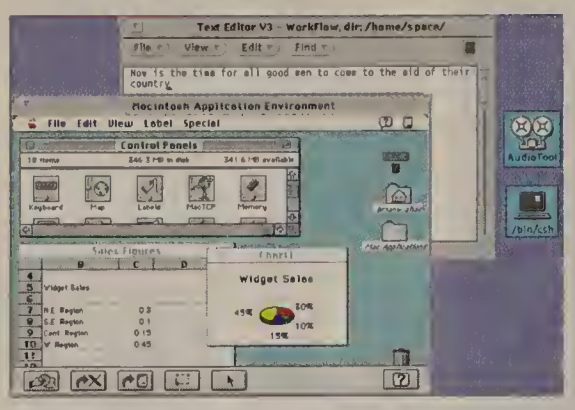
Aldus Corporation has announced that it has sold SuperCard, its Macintosh development environment, to Allegiant Technologies, in San Diego. Allegiant will take over publishing, service, and support for the product, as well as future development. Allegiant, 619/535-4803.

NEC Unveils Speedy 4X CD-ROM Drive . . .

NEC Technologies has brought out its MultiSpin 4X Pro, a quadruple-speed CD-ROM drive with an average access time of 180ms and a data-transfer rate of 600 KBps. Compatible with QuickTime and Multisession Photo CD, and designed to provide smooth full-motion video for developers, the drive is shipping now for $995. 708/860-9500, 800/632-4636.

. . . And Offers 3X Upgrade

NEC Technologies has announced that owners of its MultiSpin 74, 84, or 38 CD-ROM drives can upgrade to the company's triple-speed, MultiSpin 3X line of CD-ROM drives. Upgrading a MultiSpin 74 to the MultiSpin 3Xe costs $309, upgrading a MultiSpin 84 to the MultiSpin 3X: costs $279, and upgrading a MultiSpin 38 to the MultiSpin 3Xp costs $249 The offer expires May 27, 1994 708/860-9500, 800/388-8888



Apple's first port of the Macintosh Operating System works on Sun Unix workstations (shown here) and Hewlett-Packard Unix workstations.

Unix workstations running the HP-UX operating system with the Motif interface, and on Sun Microsystems Unix workstations running the Solaris operating system with the OpenLook interface.

MAE comes out of Apple's Business Systems division, whose mandate it is to bring the Mac into the corporate MIS and engineering market with such products as the Apple Workgroup Servers and MAE. This foray into Unix should help Apple show that it has not ceded this market to ever-lower-cost Unix workstations or high-end PCs, as several makers of Mac science and engineering software have charged.

Apple estimates MAE's performance on a midrange Sun Sparc-2 workstation to be comparable to a Mac LC II, while performance on a high-end Sparc-10 will be comparable to a Centris 650. That's middling performance given the power of those workstations, but it does give Unix users access to the thousands of Macintosh business-productivity tools. At least four companies now offer Windows emulators for the same reason. The Unix market is not huge—about 10 percent the size of the Mac market and 1 percent the size of the PC market—but Unix dominates the large corporations that Apple is pursuing aggressively.

Macintosh Application Environment uses System 7.1, with a few modifications to make it work in a Unix environment. For example, there's a Keyboard control panel to map Unix control keys to their Mac equivalents, as well as an additional option in the Monitors control panel to create the Mac's window size. There's also a tool bar at the bottom of the Mac window that lets you mount 1.4MB Mac floppies, cut and paste graphics and text between Unix and Mac windows, and constrain the mouse to the Mac window. The tool bar can be hidden and its functions replaced with commands.

MAE supports TCP/IP and the Unix NFS file structure, so Unix networking and file access is supported through the standard Mac interface. But the few applications that call the Mac OS's SCSI or NuBus managers will not work, since MAE does not support the Mac's external hardware standards. Also, MAE does not support QuickTime (movies play, but there's no sound support), and system extensions (INITs) are not supported, although some may work. Native PowerPC software also is not supported.—GALEN GRUMAN

THE AMCOEX INDEX OF USED MAC PRICES

Machine/RAM/Hard Drive	Average Sale Price	Monthly Change
PowerBook 100/4MB/20MB	$750	+$25
PowerBook 140/4MB/40MB	$1000	+$50
PowerBook 180/4MB/80MB	$1700	+$100
PowerBook Duo 230/4MB/80MB	$1150	$0
Mac Classic/2MB/40MB	$400	–$50
Mac SE/30/2MB/40MB	$600	–$50
Mac LC II/4MB/40MB	$500	$0
Mac IIsi/3MB/40MB	$600	+$50
Mac IIci/4MB/80MB	$925	+$75
Mac IIfx/4MB/80MB	$1100	+$200
Centris 650/8MB/230MB	$1350	–$150
Quadra 900/8MB/160MB	$2450	–$50

Index provided by the American Computer Exchange of Atlanta, Georgia (800/786-0717). It reflects sales during week of February 18th. Configurations include keyboard and exclude monitor and display board for noncompact models.



PETER HOEY

DayStar 68060 Accelerators

NEAR-POWERPC SPEEDUP

DayStar Digital has announced that it will introduce a series of Macintosh PDS accelerators based on the Motorola 68060 CPU, the successor to the 040 that Apple decided to forgo when it adopted the PowerPC chip as the future Mac CPU. DayStar will still sell its Turbo 040 line of 68040-based accelerators but plans to gradually supplant it with the new Turbo 060 family. The main reason for introducing products based on a chip that Apple may never use is that DayStar expects it will be a while before a lot of 680X0-based applications are available in native PowerPC versions. DayStar says its 060 accelerators will run any software that's compatible with the 040, because the 060 uses exactly the same instruction set.

The advantage of using the 060, DayStar says, is that users can get near-PowerPC speed without replacing their software, which they must do to get that speed on a PowerPC-based Macintosh (see "The Power Macintosh Arrives," in this issue). The Turbo 060 runs at 66MHz, although DayStar is investigating the possibility of a less-expensive 50MHz version.

DayStar plans to have 060 boards for most Mac II's and Quadras (the IIfx and the Quadra 840AV are exceptions) and for the Centrises. The boards are expected to ship in May, depending on availability of the chips from Motorola. The 060 boards should have street prices starting around $1500. One version will have four SIMM sockets for adding up to 128MB of RAM to the accelerator. DayStar Digital will also offer the Image 060, a model that adds a daughterboard with twin digital signal processors for accelerating Adobe Photoshop filters. Prices for the Image 060 weren't final, but should start around $2000. The Image 060 comes with Charger Suite software, filters and plug-ins for Photoshop, Storm Technology's PicturePress 2.5 JPEG compression software, Kudo Image Browser from Imspace Systems, Xaos Tools' Paint Alchemy, and Kodak's Photo CD Access and Sampler.

Those who purchased the 40MHz Turbo 040 between January 7 and March 31 will be able to upgrade to DayStar's planned 80MHz PowerPro 601, a PowerPC-based accelerator (see "Apple Unveils First PowerPC Product," *News*, *Macworld*, March 1994). Buyers of the 33MHz Turbo 040 can upgrade to a 66MHz PowerPro 601. Both upgrades will cost $199 and can be done from July 1 through December 31, 1994. DayStar Digital, 404/967-2077, 800/962-2077.
—GALEN GRUMAN

QuickDraw Accelerator

RADIUS GRAPHICS BOARD

Continuing the race for graphics professionals' NuBus slots, Radius debuted its $2999 LeMansGT video board, which it says is the fastest 24-bit Macintosh QuickDraw accelerator available.

The 6.5-inch board's optimized ASIC chips deliver QuickDraw performance 230 percent faster than a Quadra's built-in video does, according to Radius. The LeMansGT's 3MB of VRAM lets it display 24-bit images at resolutions as high as 1152 by 882 pixels. Radius includes a lifetime warranty with on-site, overnight replacement of defective boards. Radius, 408/434-1010, 800/227-2795.

—JIM FEELEY



MARK JOHANN/SCREEN IMAGE BY GORDON STUDER

The Apple Multiple Scan 20 Display uses a 0.31mm stripe-pitch Trinitron tube and can show resolutions from 640 by 870 pixels up to 1280 by 1024 pixels.

Two-Page Apple Display

LOWER-PRICE MULTISYNC

The Apple Multiple Scan 20 Display is a two-page color monitor intended for graphics and publishing professionals. The heart of the package is Sony's new N1 20-inch Trinitron tube with a 0.31mm stripe pitch. The new monitor is not of as fine a quality as Apple's current 13-inch and 16-inch offerings, nor as fine as the current Macintosh 21" Color Display, which it will replace; but the Multiple Scan 20 is still not bad for a monitor of its size. As its name suggests, the monitor supports multiple resolutions, ranging from 640 by 870 pixels up to 1280 by 1024 pixels, all at a 75Hz vertical refresh rate. At the standard Apple two-page resolution of 1152 by 870, images appear at about 80 dpi. By way of comparison, an average 14-inch monitor displays images at between 65 and 70 dpi.

Users of the new Apple monitor will find bells and whistles typically offered only on large, high-end monitors; there's a front panel loaded with digital controls—brightness, contrast, horizontal and vertical size, convergence, trapezoid, and pincushion. Meanwhile, color perfectionists can adjust the monitor's color temperature by choosing one of three white points (the unit's ColorSync profiles are included). Users can fine-tune the display for different resolutions, and since all the controls are digital, the monitor will remember up to ten groups of settings and automatically configure itself when it recognizes a resolution.

The Multiple Scan 20 comes with new Display Manager and Monitors control-panel software that lets you switch resolutions without a restart, if the on-board video hardware or graphics card supports this feature. According to Apple, older Macs won't be able to do this, and most graphics-card manufacturers will have to update their boards. With the new system software, users will also be

continues

BUGS & TURKEYS

The System 7 Pro installer doesn't list the Quadra 660AV as a supported Mac. If you try to work around the problem by selecting the Centris 660AV from the list, messages tell you every system file you try to replace on the Quadra 660AV is newer than the System 7 Pro version. Apple says the fix is 040 Enabler 1.1.

A bug in CE Software's QuickMail keeps the 57th user in a mail center from accessing the mail center with QuickMail Remote. CE said a free patch would be posted on online services in the first quarter of 1994. The workaround is to create a phantom 57th user; you may have to rename the phantom if you add users.

The WordPerfect Corporation says WordPerfect is the "most Macompatible word processor anywhere." But WordPerfect users can't directly import their files from WriteNow 3.0, and the company says it is not working on a filter for WordStar's product.

Software Dispatch, Apple's CD-ROM of Macintosh applications, sneaks an extension file into the System Folder without telling users. Worse, this extension conflicts with some other extensions. Removing the Software Dispatch extension ends the conflicts, but also removes all the information for unlocking any applications you may have purchased.

Macworld will send you a Bug Report T-shirt if you are the first to inform us of a serious, reproducible bug that we report in this column, or a Turkey Shoot T-Shirt if we shoot your turkey in this space. See *How to Contact Macworld*.

In Brief

Mobius Drops Accelerator Prices

Until March 31, Mobius Technologies is offering a promotion on its Speedster line of 68040 accelerators. You can save $300 on a 25MHz model without FPU (now $399). Savings on the same model with FPU ($499), on 33MHz versions with and without FPU ($599 and $799, respectively), and on a 40MHz version with FPU and cache (now $1199) are all around $400. 510/654-0556, 800/523-7933.

Practical Peripherals Cuts Modem Prices

Practical Peripherals has reduced prices on several high-speed fax modems. The PM-14400FX PKT/Mac (portable 14.4-Kbps fax modem) now retails for $429; the PM14400-FXMT/Mac (desktop 14.4-Kbps fax modem), for $279; and the PM9600FXMT/Mac (desktop 9600-bps fax modem), for $229. 805/497-4774, 800/442-4774.

Dayna's ProFiles

Dayna Communications is shipping its $129 ProFiles file-management application. Users can synchronize files and folders; move, copy, and compress in the background; and create custom, compiled directories of files and folders in different locations (hard drives, removable media, file servers). A PowerPC native version will ship this spring. 801/269-7394, 800/531-0600.

Nanao Reduces Prices, Extends Warranty

Nanao USA has cut the price of its FlexScan monitors, extended its warranty on all existing FlexScan IW models to three years, and offered rebates of up to $100 for monitors bought this year. Prices now start at $799 for the 15-inch color F340iW and top out at $2799 for the 20-inch color Trinitron T660i. 310/325-5202.

able to adjust their monitors' configuration (virtual-desktop layout and menu-bar location) without restarting. The Multiple Scan 20 is compliant with both the MPR II guidelines and Energy Star, and the monitor ships with a tilt-and-swivel base with one ADB-in port and two ADB-out ports—but without audio in/out jacks.

The display will work with any Mac that has a video-out port, and will sync to most PC-compatible standards, including VGA and SVGA. Apple includes a Mac-to-PC adapter. The announced price of $2149 puts the company in direct competition with third-party monitor manufacturers. Apple, 408/996-1010, 800/776-2333.—CAMERON CROTTY

DiskDoubler, SuperDoubler

COMPRESSION UTILITIES

Working toward giving your files some elbow room, Symantec has released version 4.0 of DiskDoubler. The company has also bundled three Fifth Generation compression and Finder-accelerator utilities into SuperDoubler 1.0.

Version 4.0 of DiskDoubler mainly offers faster and tighter compression. Users select one of five methods based on their space and time constraints. A new Archive feature combines files and folders into compressed archives. Individual files may be added, moved, and deleted with drag-and-drop operations within the DiskDoubler application.

For users who want the whole compression enchilada, Symantec has released SuperDoubler 1.0. The package consists of the aforementioned DiskDoubler 4.0, plus AutoDoubler 2.0 and CopyDoubler 2.0, all rolled into one. AutoDoubler automatically compresses hard-disk contents in the background, while CopyDoubler replaces the System 7 Finder copy and delete (Trash) functions, increasing the speed of both operations.

DiskDoubler 4.0 and SuperDoubler 1.0 are currently available for $79.95 and $109, respectively, from Symantec, 310/453-4600, 800/441-7234.—CAMERON CROTTY

SyQuest's 270MB Drive

3.5-INCH REMOVABLE

SyQuest has announced a Mac version of its 3.5-inch, 270MB removable hard drive mechanism. The SQ3270S is SCSI-2 (backward-compatible to SCSI) and features 13.5ms average seek times and 21.8ms average access times. The drive will read and write SyQuest 3.5-inch 105MB cartridges, and so far MacWarehouse, PLI, FWB, MicroNet, APS, MacUSA, ClubMac, Focus, and Procom expect to use the mechanism in their products. At press time, suggested retail prices for companies' external versions were ranging from $699 to $899. Internal versions will be about $675 list. SyQuest, 510/226-4000, 800/245-2278.—CAMERON CROTTY



TOM GIBSON

PLI's Infinity 270 Turbo uses SyQuest's latest, a 3.5-inch, 270MB removable-cartridge drive called the SQ3270S.

TREND

Wireless Communicator

WITH GENERAL MAGIC'S TECHNOLOGY



SCOTT PETERSON

Motorola's envoy weighs 1.6 pounds and uses General Magic's Telescript and Magic Cap to offer a variety of wireless communications capabilities.

Since no PDA should be an island, Motorola introduced the envoy, a 1.6-pound, $1499 personal communicator that is the first to integrate two-way wireless communications with General Magic's Telescript and Magic Cap communications software. With a serial cable Mac owners can use the envoy as a wireless modem or adjunct to a PowerBook.

With its wireless modem and software, the envoy can reach any Internet address, fax machine, or pager in the world. The envoy provides automatic routing of messages to AT&T Mail, Skytel, EMBARC, and MCI Mail.

Unlike the Newton, the envoy does not claim to recognize handwriting. Instead, like the Newton, the envoy records handwriting as a bitmapped graphic and accepts data typed in through a small keyboard on the screen.

Navigating the Magic Cap operating system's Desk, Hallway, and Downtown interface, users can access software applications and online services. Telescript's intelligent agents can seek, deliver, and retrieve data.

The device includes 1MB of RAM; a fax/data modem; a 4800-bps wireless RF modem; a 38.4-Kbps infrared transceiver; and two Type II PCMCIA slots for RAM, ROM, or flash memory.

The envoy ships with RadioMail Eudora, AT&T Magic Mail, AOL Client, PenCell (a spreadsheet), OAG Client (for flight information), Pocket Quicken, and e-Shop.

Motorola plans links with information services. The envoy should ship this spring. Motorola, 708/576-1600.—JIM FEELEY

AppleScript Development

EASIER DEBUGGING

By April, Main Event plans to release Scripter, a development environment for writing AppleScript scripts. Unlike Apple's AppleScript Editor, which has minimal tools for script creation, Scripter has debugging tools (such as stepping and syntax checking) and find/change facilities. It can load the language specifications for any AppleScript-enabled program and can display the correct syntax and options for program commands and objects, so developers or end users can learn the syntax for any programs they want to script. Main Event, 202/298-9595.

—GALEN GRUMAN

FUTURE STORAGE.

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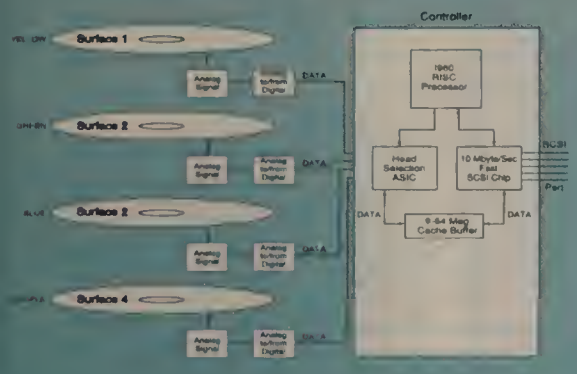
8 MB/Sec Data Transfer Rate - 5.2 Gigabyte Capacity



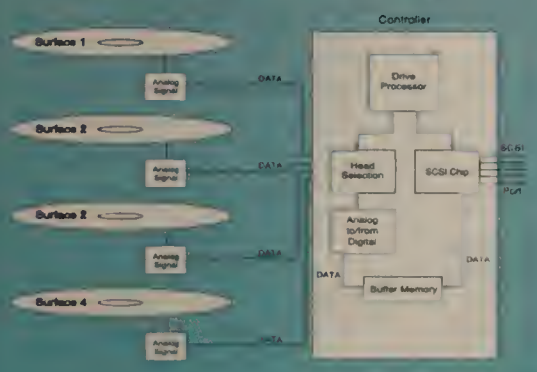
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Scan Frequency	H:30-62KHz	H:30-62KHz	H:30-65KHz	H:30-65KHz	H:30-85KHz
	V:50-90Hz	V:50-90Hz	V:50-90Hz	V:50-90Hz	V:40-100Hz
Macintash Compatibility	640x480/67Hz 832x624/75Hz	640x480/67Hz 832x624/75Hz	640x480/67Hz 832x624/75Hz	640x480/67Hz 832x624/75Hz	640x480/67Hz 832x624/75Hz 1152x870/75Hz
Full Screen	Yes	Yes	Yes	Yes	Yes
Low Radiation	Yes	Yes	Yes	Yes	Yes
Digital Control	-	-	Yes	Yes	Yes
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End users circle 38 on reader service card

Dealers circle 39 on reader service card

PowerPC News

Apple Servers Join Lineup

SPEED BOOST TO COME LATER IN THE YEAR

As part of its strategy to move the entire Mac line to PowerPC, Apple Computer plans to release versions of two Workgroup Servers in May that use the PowerPC 601 CPU. However, the servers won't realize the benefits of the 601's faster speed for at least several months, when the server software is rewritten as native PowerPC software, Apple says.



MARK JOHANN

Apple plans to release two PowerPC-based servers in May, based on the current Workgroup Server 60 and 80.

The lineup Apple's two PowerPC servers are based on the desktop counterparts—the Power Macintosh 6100 and 7100—that began shipping on March 14 (see the feature "The Power Macintosh Arrives," in this issue). Apple hadn't finalized the pricing at press time.

- The 6100-based server is essentially the same as the Power Macintosh 6100/60, with the addition of a 256K secondary cache and standard Workgroup Server software. It is basically a PowerPC-based Workgroup Server 60.
- The 8100-based server is essentially the same as an 8100/80. It is fundamentally a PowerPC-based Workgroup Server 80.

Both servers lack the video card that comes with their Power Mac counterparts. Instead, they rely on the RAM-based back-panel video port, which supports 14-inch and 16-inch monitors at 16-bit and 8-bit color, respectively.

Apple says it will continue to sell the Workgroup Server 60, 80, and both configurations of the 95—at least as long as customers buy them.

Upgrade options There will be motherboard upgrades from the Workgroup Server 60 and 80 to the PowerPC equivalents. Upgrade prices were not final at press time.

The 601-based servers will require updates to the Apple networking software to make the software PowerPC-compatible, since servers are more sensitive to operating-system peculiarities than desktop Macs are, Apple says. The first set of networking software to be revised will be AppleShare, AppleSearch, and Apple Remote Access, all of which will be updated in time for the PowerPC servers' ship date, Apple says. Later in the year, Apple expects to ship native PowerPC versions of these programs.

Equivalent performance Apple expects no noticeable performance difference between the current 040-based Workgroup Servers and the new 601-based servers because much of a server's performance is determined by the network, not by the CPU, and most of the communications services that are available for the PowerPC servers will still be running in 680X0 emulation, not as native PowerPC code. But Apple expects better performance for the communications services as more and more network software is ported to PowerPC code.—GALEN GRUMAN

Power Watch

THE LATEST PRODUCTS FOR THE POWER MACS

Apple Computer has detailed the bundles it will offer of Insignia Solutions' SoftWindows software with certain configurations of the Power Mac. The bundles will ship with 16MB of RAM and include a 250MB drive on the 6100/60 and 7100/66 and a 500MB drive on the 8100/80. The bundle will cost (depending on model) about $385 to $825 more than a similarly configured Power Mac without SoftWindows. SoftWindows is also available separately for $499 from Insignia.

- Light Software plans to introduce three new programs in fat-binary format for use on Power Macs and 680X0 Macs: Light Paint for image editing, Light Compress for file compression, and Light Protect for file encryption. The prices will be about $100 for Light Paint and $50 for the others. (The feature "Power Mac Software," in this issue, includes details on other companies' PowerPC software plans.)
- Yarc Systems Corporation has begun shipping the Zuma 601, a PowerPC 601-based coprocessor board that accelerates Specular International's Infin-D, CoSA's After Effects, Strata's StudioPro, Pixar's MacRenderMan, and VIDI's Presenter Professional. Yarc expects other programs to support the board later this year. A 50MHz board costs $3095, a 66MHz board $3595, and an 80MHz board $4095. The boards include 16MB of RAM and work in any Mac that supports 12-inch NuBus boards.
- NEC Technologies will offer a free AV video adapter to owners of its current monitors. That adapter is needed to connect a standard monitor to a Power Mac's back-panel video port or to a 680X0-based AV Mac's video port.

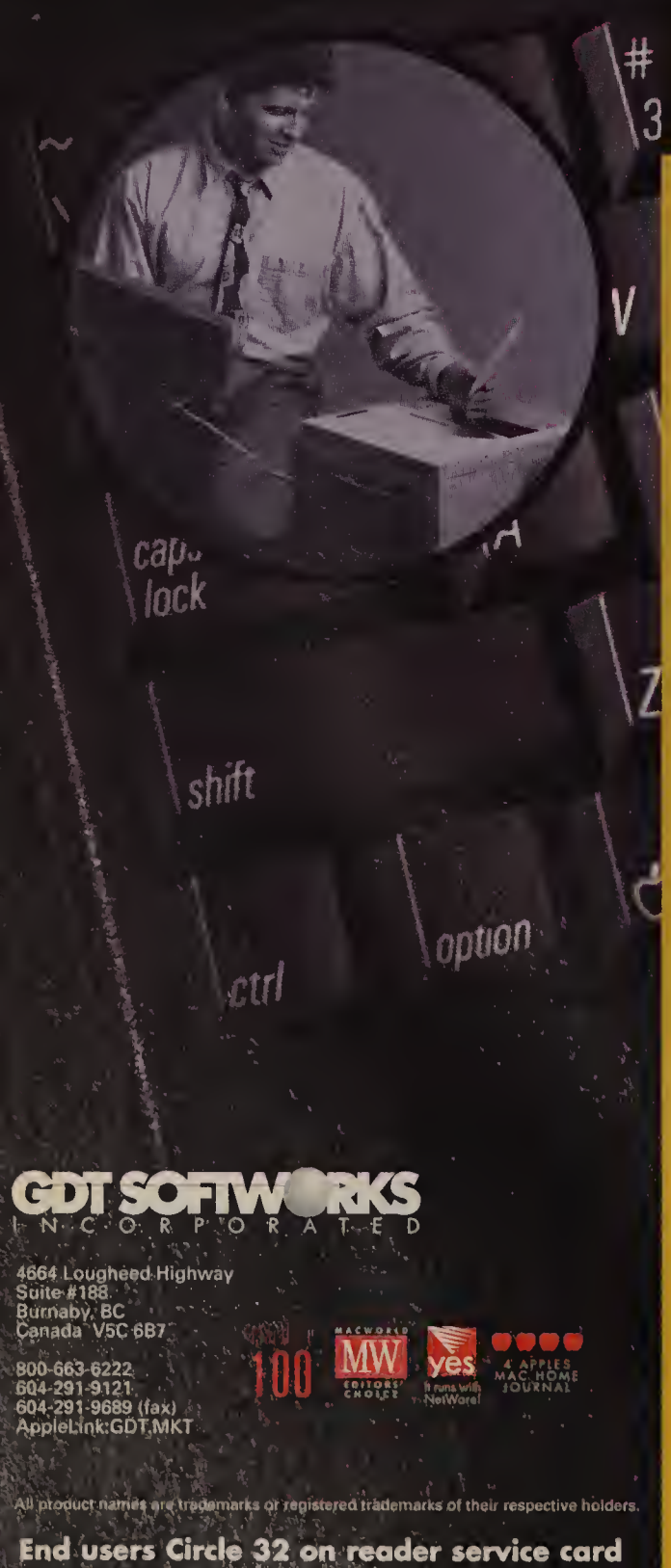
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End users Circle 32 on reader service card

New Products

THE LATEST MACINTOSH RELEASES

by Cameron Crotty

THIS SECTION COVERS MACINTOSH PRODUCTS FORMALLY ANNOUNCED BUT NOT YET EVALUATED BY *MACWORLD* UNLESS OTHERWISE STATED. THE MINIMUM REQUIREMENTS FOR OPERATION ARE A MAC PLUS, WITH 1MB OF RAM, RUNNING SYSTEM 6. ALL INFORMATION AND PERFORMANCE CLAIMS ARE SUPPLIED BY THE PRODUCT VENDOR AND HAVE NOT BEEN INDEPENDENTLY VERIFIED BY *MACWORLD*. ALL PRICES ARE SUGGESTED RETAIL. PLEASE CALL VENDORS FOR INFORMATION ON AVAILABILITY

HARDWARE

Cascade CD 100

This 100-platter SCSI CD-ROM jukebox plants up to 65GB of online storage on your Finder desktop. The Cascade features a Toshiba double-speed CD-ROM drive with 310ms average access times and 300-KBps sustained data-transfer rates. The drive can handle most disc formats, including CD-ROM XA, Photo CD, ISO 9660, and CD-I. Pinnacle's Virtual File System software is included, and allows access to the library through volume or file aliases. Users select a volume, and PVFS automatically retrieves the appropriate disc, usually in under six seconds. $9995. Pinnacle Micro, 714/727-3300, 800/622-1722; fax 714/727-1913.



Cascade CD 100

DFT/Mac

Long-distance phone calls are expensive, and high-speed communications lines are even worse, so this communications package uses as much bandwidth as possible to transfer your files up to three times as fast as typical network connections. The heart of this system is the Mac/SD, a NuBus synchronous communications card that supports analog telephone, switched 56, ISDN, and leased lines up to 4 Mbps. The card also supports RS-232, V.35, EIA-530 (RS-422, RS-449), and X.21. File-transfer software is included. $1600 per node (two required). Niwot Networks, 303/444-7765; no fax.

EyeQ AV

Taking advantage of the technology in Apple's new AV Macs, this board plugs into the machines' Digital Audio Video (DAV) connector, and can digitize and compress video to the hard drive in real time at up to 30 frames per second. The device supports monitors up to 16 inches (832-by-634-pixel resolution) and NTSC, PAL, and S-Video. It is also software-upgradable to support new compression algorithms as they are developed. The board ships with the company's capture/compression and editing utility. Requires Quadra 660AV or 840AV, System 7.1. $1895. New Video Corp., 310/396-4000; fax 310/396-0282.

Jet Stream Color Image Servers

Based on Silicon Graphics Indigo workstations, this line of image processors downloads and renders TIFF, TARGA, and PostScript files over an Ethernet network, on 3.5-inch floppies, or on 44MB or 88MB removable hard drive cartridges. Or you can simply print PostScript files to the Jet Stream as if it were a laser printer, and the server then sends the output to one of the company's film recorders via a SCSI interface. The Jet Stream 16 comes with an SGI Indigo R4000, a 1.7GB hard drive, and 80MB of RAM. The Jet Stream 8 comes with an Indigo R3000, a 1.7GB hard drive, and 48MB of RAM. The Jet Stream 4 comes with an Indigo R3000, a 528MB hard drive, and 32MB of RAM. Jet Stream 16 $49,900; Jet Stream 8 $42,500; Jet Stream 4 $34,000. Management Graphics, 612/854-1220; fax 612/851-6159.

LFR Mark III

This 8000-line-resolution SCSI digital film recorder features 36-bit color, computer-controlled linearity and geometry, and dynamic focusing for corner-to-corner image clarity. An internal rasterizing system allows the product to image files while you continue working on your Mac. The Mark III ships with the company's SmartBack 35mm camera. $19,995. Lasergraphics, 714/753-8282, 800/727-2655; fax 714/727-2653.



MacCD Stations

MacCD Stations

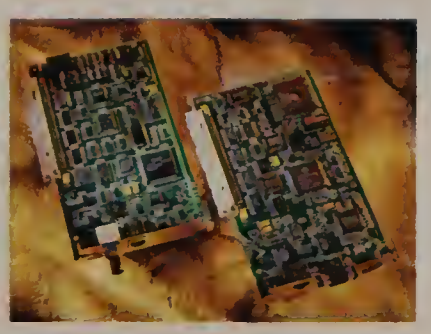
Starting with a CD-ROM drive, these multimedia upgrade packages add 9-watt amplified stereo speakers and several CD-ROM titles. The Station 2B features a double-speed, tray-loading drive with an average access time of 380ms and a data-transfer rate of 300 KBps. The Station 3 has a triple-speed caddy drive with an average access time of 195ms, and a data-transfer rate of 450 KBps. Bundled CD-ROM titles include Icom Simulations' Sherlock Holmes, Consulting Detective; Compton's Interactive Encyclopedia; and a music sampler. Station 2B $449; Station 3 $699. Procom Technology, 714/852-1000, 800/800-8600; fax 714/852-1221.

MacIRMA NuBus Coax Adapter

A 7-inch NuBus card that connects Macs to IBM 3270 mainframes via coax or unshielded twisted-pair wiring. The card can be upgraded via software download, and it ships with the company's IRMA WorkStation for Macintosh connectivity software. $1195. Digital Communications Associates, 404/442-4000, 800/348-3221; fax 404/442-4366.

MacIRMAtrac NuBus Token Ring Adapter

Replacing DCA's existing LanWay and MacIRMA 4/16 Token Ring adapters, this 4-Mbps or 16-Mbps (software-selectable) adapter connects a Mac to a Token Ring network, automatically sensing whether the media is shielded or unshielded twisted-pair. The 7-inch, DMA NuBus card supports the company's IRMA WorkStation for Macintosh and MacMainFrame 802.2 host connectivity software, and features 512K of RAM for downloading microcode, including logical link control. $895. Digital Communications Associates, 404/442-4000, 800/348-3221; fax 404/442-4366.



MacIRMA NuBus Coax Adapter and MacIRMAtrac NuBus Token Ring Adapter

RF-4000

With this SCSI CD recorder, you can cut ISO 9660, CD-ROM XA, CD Multisession, CD-I, and CD-Audio formats. The recorder has average access times of 1 second, has sustained data-transfer rates of 352.8 KBps, and uses CD-R recordable CDs. Comes with Corel's SCSI Pro recording software and two CD-R discs. $5995. Plasmon Data Systems, 408/956-9400, 800/445-9400; fax 408/956-9444.



RF-4000

ROMWriter I

This external CD-ROM recording system uses the Ricoh CD-Recordable drive mechanism, which supports both multisession and incremental writing. With the included software, users can produce ISO 9660, CD/XA, Mac, Unix Filesystem, and RockRidge formats. The package ships with everything you need to write your first disc, including software (Mac, DOS, Windows, NEC, HP-UX, and Sun OS), SCSI cable, documentation, and a blank CD. $4295. Logical Engineering LC, 813/264-5236; fax 813/264-5140.

Sonnet BudgetBooster

Slide one of these cards into the PDS slot of your Mac LC, LC II, Color Classic, or Performa 400, 405, or 430, and you'll increase your machine's performance to near Mac LC III levels. All cards have a 25MHz 68030 chip, except the LC II version, which has a 25MHz 68020. All cards also include a math coprocessor. $99. Sonnet Technologies, 714/261-2800, 800/945-3668, fax 714/261-2461.

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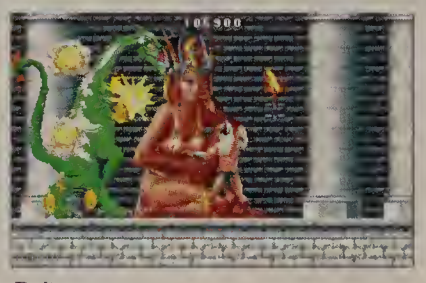
Vopex-8M
This video splitter box drives up to eight monitors from your Mac's video-out port. Monitors must be the same type, but since the unit has its own power supply, all eight monitors can be placed up to 200 feet away from the box, with the proper cables. Possible uses include classroom or trade-show environments, or anywhere you need multiple screens showing the same output. The Vopex-8M ships with a single 3-foot cable for plugging into your Mac. $865. Network Technologies, 216/562-7070, 800/742-8324; fax 216/562-1999.

SOFTWARE

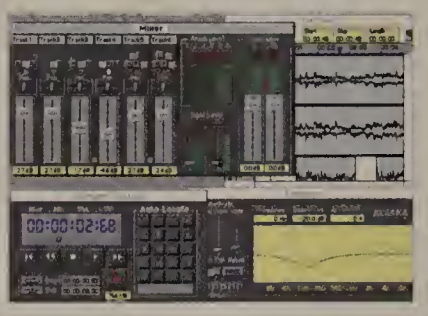
Automap Road Atlas for Macintosh
No matter where you go, there you are. Automap's Atlas calculates the quickest, shortest routes, and alternative routes, between any two locations in North America chosen by the user. The package gives mileage, estimates the time the trip will take, and displays the route on color maps. Users also get driving instructions and geographical and road data, including state and city populations, land areas, and driving laws. 2MB min. memory; requires Mac Classic II. $99.95. Automap, 206/455-3552; fax 206/455-3667.

Cal
This calculator and calendar combination speaks to you. It repeats what you've input, whether by keyboard or mouse (or by voice with an AV Mac), so you can check your entries by ear as you work. The calculator sports an animated electronic tape that you can scroll, print, select, export, and import, plus scientific and programmer's functions, including an expression parser for nested algebraic equations. The calendar features time and date scheduling, reminders, search by text string, and recurring events. You can also customize the size of the calculator buttons, the software's voice, and the color of nearly every display item. $79.95. Thought I Could, 212/673-9724; fax 212/260-1194.

Deliverance
A four-way scrolling arcade adventure in a medieval castle. As the hero, Stormlord, you must battle mythical creatures and save imprisoned fairies. You encounter bats, fire-breathing dragons, mechanical spiders, poison gas machines, and other challenges too horrible to mention here. Be sure to look out for hidden keys and coins, which increase your endurance. 4MB min. memory; requires Mac LC, 4-bit color. $49.95. Inline Software, 203/435-4995, 800/453-7671; fax 203/435-1091.



Deliverance



DigiTrax

DigiTrax
Here's a multitrack digital audio recorder and editor that puts the DSP chip in your AV Mac to work. You can capture up to six tracks of 16-bit audio at sample rates up to 48kHz and then edit them. The software includes a six-band equalizer to fine-tune your audio, and you can sync your mix to any MIDI Manager–compatible sequencer or to a QuickTime movie. While you work, DigiTrax plays the appropriate frames to keep you on track with your multimedia presentation. 8MB min. memory; requires Centris 660AV, Quadra 660AV, 840AV, or Mac with ARTA-compatible NuBus card. $349. Alaska Software, 408/738-3320; fax 408/524-9699.

El-Fish
Sick of cleaning algae off the inside of your aquarium? With this software you can create and breed exotic fish, and then design an aquarium for them to live in. Your fish, whether relatively normal or relativistically altered, swim around castles, coral, miniature plants, even a cat's paw that swoops into the tank. 5MB min. memory; requires Mac LC, 8-bit color, System 7. $59.95. Maxis Software, 510/254-9700, 800/336-2947; fax 510/253-3736.

FlipBook
Before there was multimedia, kids watched pen-and-ink characters animate as they riffled through flip-books. This software opens QuickTime, PICS, or Scrapbook-based movies and prints them out as individual frames that users can cut out and assemble into flip-books. Scissor lines, cropmarks, and binding marks aid in the assembly, and the Better Thumb Control option allows authors to create books with sequentially increasing card size for users with limited dexterity. 2MB min. memory. $89. S. H. Pierce & Co., 617/338-2222; fax 617/338-2223.

Imaxis
Moving earnestly toward the futuristic promise of a paperless office, we present a document-management system. When a paper document comes into the office, an employee enters it in the system with the company's scanning and OCR software (OCR sold separately), and files it on a central server. Other workers can then access documents using client software. Users control how

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they arrange their documents, and three security levels control which users can see, move, or make changes to documents. The full text of each document is indexed and searchable, and users can place bookmarks to return to documents. Client requires 5MB min. memory, Mac II, System 7.1. Server requires 5MB min. memory, Mac IIsi, System 7.1. Four-user pack (includes scanning and server software and four clients) $2695; OCR software $995. Systems Engineering Solutions, 703/573-4366, 800/462-9470; fax 703/207-9146.



JapanClips

JapanClips
Helping you get your message across with a Far Eastern flair, this EPS clip art package features 170 images and 60 calligraphy pieces, most drawn from traditional and modern Japanese culture. Included software contains bitmap previews and English-language explanations of all the images. The previewing application describes an image's significance for the average Japanese and, where appropriate, makes suggestions for use. $99. Matsuri Graphics, 812/336-1326; fax 812/339-5422.

Key Into Dictionaries
Based on Random House's foreign-language dictionaries, each of these bilingual, bidirectional dictionaries has over 30,000 entries. You type in three or four letters of a word, and the software starts bringing up possible entries. You can keep typing until you get the one you want, or stop and use the mouse to highlight the desired word. A translation then appears that you can copy and paste via the Clipboard. Spanish, Italian, German, and French versions are available, and each dictionary also includes a pronunciation guide plus tables of useful words and phrases, months, days of the week, numbers, signs, and food terms. $59.95. Exceller Software Corp., 607/257-5634; fax 607/257-1665.

Koyn Fractal Studio
From the world of mathematics comes a package that is designed to provide graphic artists with fresh ideas and textures. Instead of typing in formulas or studying up on the Julia set, you define polygons that the software then transforms and repeats on a smaller and smaller scale. The package saves documents in PICT format, and you can import PICT files to serve as templates for fractal designs. A library of more than 50 color fractals is included. $149.95. Koyn Software, 314/878-9125; fax 314/878-9125.


Koyn Fractal Studio

LineWorker
Users can import and export Scitex Handshake Linework files with this Photoshop plug-in. After transferring a Scitex scan to a Mac as a Linework file (additional hardware and software required), users can now edit the scan in Photoshop, colorizing or tinting it or editing existing color tables. The finished work can then be exported back into Linework format for placement into a page-layout program, or transferred directly back to a Scitex system. Requires Adobe Photoshop 2.01. $295. In Software, 619/743-7502; fax 619/743-7503.

Logo SuperPower
With more than 2000 graphic elements to choose from, edit, and combine, you could be looking at your new business logo before you know it. The package includes Base Graphics, such as eagle heads, light bulbs, waves, and water drops, to which you can apply such corporate-looking graphic effects as wavy lines, radial designs, and lightning bolts. All design elements are in Adobe Illustrator file format. $279. Decathlon Corp., 513/421-1938, 800/648-5646; no fax.

MetaFlo'
Like the company's Flo' software, this package allows you to perform twisting, pulling, and stretching distortion on still and moving images (PICT, TIFF, PICS, and QuickTime supported). With MetaFlo', you get multiple maskable layers with transparency controls, and SMPTE time-code stamping on key frames. To save time and protect your original document, the software uses a subsampling algorithm to map your distortions, but doesn't actually change an image until you save it as a nonnative file format. 5MB min. memory; requires Mac II, math coprocessor. $595. Valis Group, 510/236-4124, 800/825-4704; fax 510/236-0388.

Pattern Manager
Choose and create desktop patterns with this ppat-resource-editing software. Users can import and export patterns either via the Clipboard or in PICT file format and can have multiple pattern files open, each with up to 30,000 patterns at sizes up to 256 by 256 pixels. Create a pattern within your favorite graphics application, and edit it in Pattern Manager and install it on the desktop with the Desktop Preview tool. Requires Mac Classic. $59.95. Mantis Development, 617/969-6434, 800/230-6434; fax 617/647-9636.

PixelPutty
After you fire up Pixar's Showplace with this plug-in installed, just select one of the four starting shapes (sphere, cylin-

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der, cone, or mesh) and start pushing, pulling, and pinching it. This spline-based modeler mimics the reactive characteristics of clay or putty, allowing you to create organic shapes quickly. Models can also be imported for tweaking and refining. Requires Showplace 2.0. $129. Valis Group, 510/236-4124, 800/825-4704; fax 510/236-0388.

PlateMaker
Normally, for special print applications such as spot-color or varnish masks, foil stamping, and embossing, you have to either duplicate the document to place each special effect (and worry about registration problems), or manually strip in the film. But this Adobe Photoshop plug-in can create single or multiple PostScript separation plates according to the DCS 2.0 specification from Quark. Users can create additional channels and simply export them as fifth and sixth plates. Requires Photoshop 2.01, page-layout software that supports DCS 2.0. $295. In Software, 619/743-7502; fax 619/743-7503.

PostView
With this software, you can assemble audio tracks without waiting for a tape to shuttle back and forth. The package shows you a QuickTime movie as a reference, while you add sound effects, music, dialogue, or other audio. PostView establishes frame-accurate synchronization between the audio and video, so you can write your finished video to tape. The software also features VTR Control, for controlling external video or audio machines via Sony 9-pin or VLAN protocols. Requires 68040 and video-capture hardware and software. $1495. Digidesign, 415/688-0600, 800/333-2137; fax 415/327-0777.

Running On Time 2.0
Time-management, time-billing, and expense-account software that tracks what you do and how much it's worth. The package manages projects, billing, and type of work done and who's doing it, and allows for multiple-currency expense accounts. Analysis features are available, including breakdowns of project activities, and comparisons of target hours and billing against actual hours and billing. Running On Time works as a module of Manzanita's Flexware accounting system. 2MB min. memory; Flexware Job Cost Module. Five-user license $995. GlobaLogic, 613/721-0240; fax 613/829-0314.

ScanShare
Any scanner that supports the Apple Scanner Interface (including the AppleScanner, Apple OneScanner, and some scanners from Agfa, Hewlett-Packard, and Umax) can now be a shared resource over an AppleTalk Network. This software runs as a Chooser extension and allows a networked Mac to receive from a scanner as if the two were directly connected. Transfers can occur at up to 10 Mbps, depending on network type and traffic. ScanShare supports password protection and arbitrates concurrent device requests. Ten-user license $89. Stalker Software, 415/927-1026, 800/262-4722; fax 415/927-1026.

Snoopy Screen Saver Fun Pac
Be on the lookout for the Red Baron when you install this pack of four programs on your Macintosh. When you start up your machine, a Peanuts character greets you with a randomly selected quotation. Once at the Finder, you can install one of 20 Magic Patterns featuring the Peanuts characters, and with the Icon Sticker and Peeler you can customize your disk, folder, and document icons. Finally, the Fun Pac includes eight After Dark–compatible screen-saver modules and the After Dark engine. 4MB min. memory; requires System 7, color. $49.95. Image Smith, 310/325-1429, 800/876-6679; fax 310/539-9784.

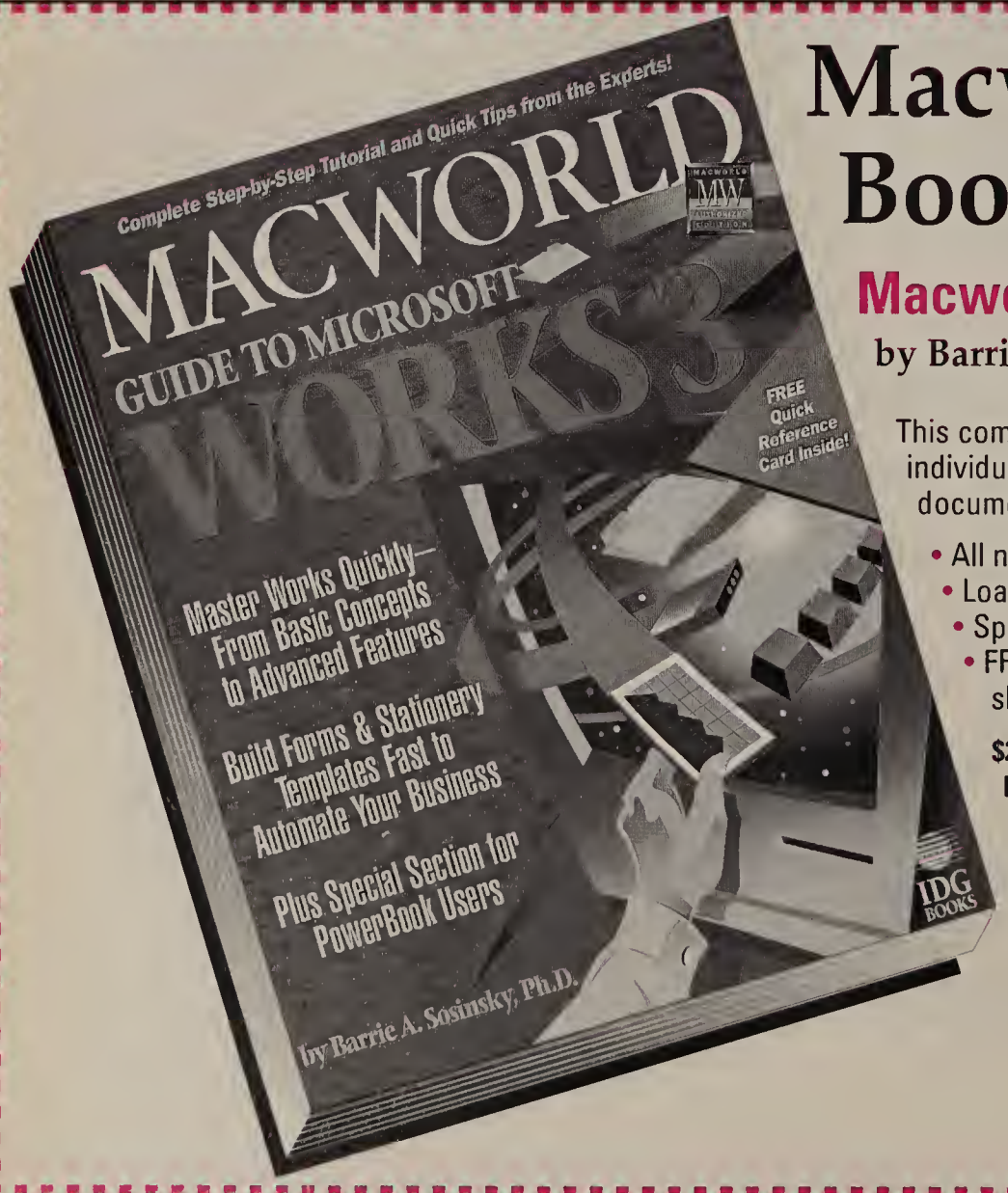
Transparent Language 2.0
Instead of teaching a foreign language with vocabulary flash cards, drill sessions, and "See Spot run" texts, this software coaches you through magazine articles, poetry, and fiction with instant vocabulary and grammar feedback windows. The latest version features a preface written by the linguist who prepared each title, the ability to print the text in the original language, a vocabulary-building game, and options for placing personal notes within a title. The package ships with three titles, and more are available separately. $139; additional titles range from $14.95 to $24.95. Transparent Language, 603/465-2230, 800/752-1767; fax 603/465-2779.

Vision 2.0
You're jammin', and you need to get it down on your Mac. The latest version of this MIDI sequencing software features standard music-notation, editing, and printing; a menu for navigating window variations; movable tracks; unlimited sequences in a file; a 3-D–style interface; and a Groove Quantize option. With this last feature, your Macintosh uses a previously recorded track as a baseline in order to capture subtle shifts in the rhythmic phrasing of a current performance. 4MB min. memory; requires System 7, MIDI interface, MIDI instrument. $495. Opcode Systems, 415/856-3333, 800/557-2633; fax 415/856-3332.

CD-ROMS

Disc-To-Disk
When you play an audio compact disc with your CD-ROM drive, this software digitizes the audio and shoots it straight onto your hard drive in 8-bit mono or 16-bit stereo at up to 44.1kHz. You choose what, where, and when you want to capture, down to 4/75-second accuracy, and the software grabs the sound; compresses it if you want to; and saves it as an AIFF/AIFC, QuickTime, Sound Designer II, SND, or Windows WAV file. 5MB min. memory; requires CD-ROM drive that transfers audio data over SCSI port. $199. Optical Media International, 408/376-3511; fax 408/376-3519.

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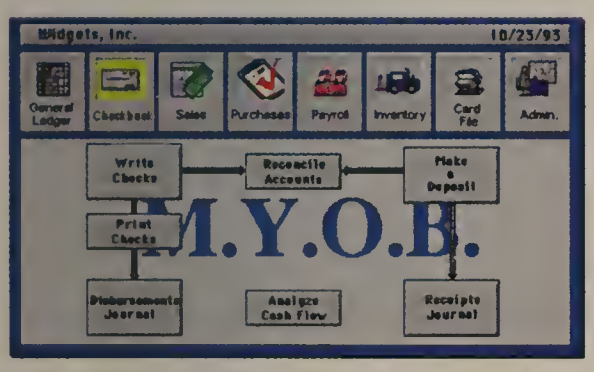
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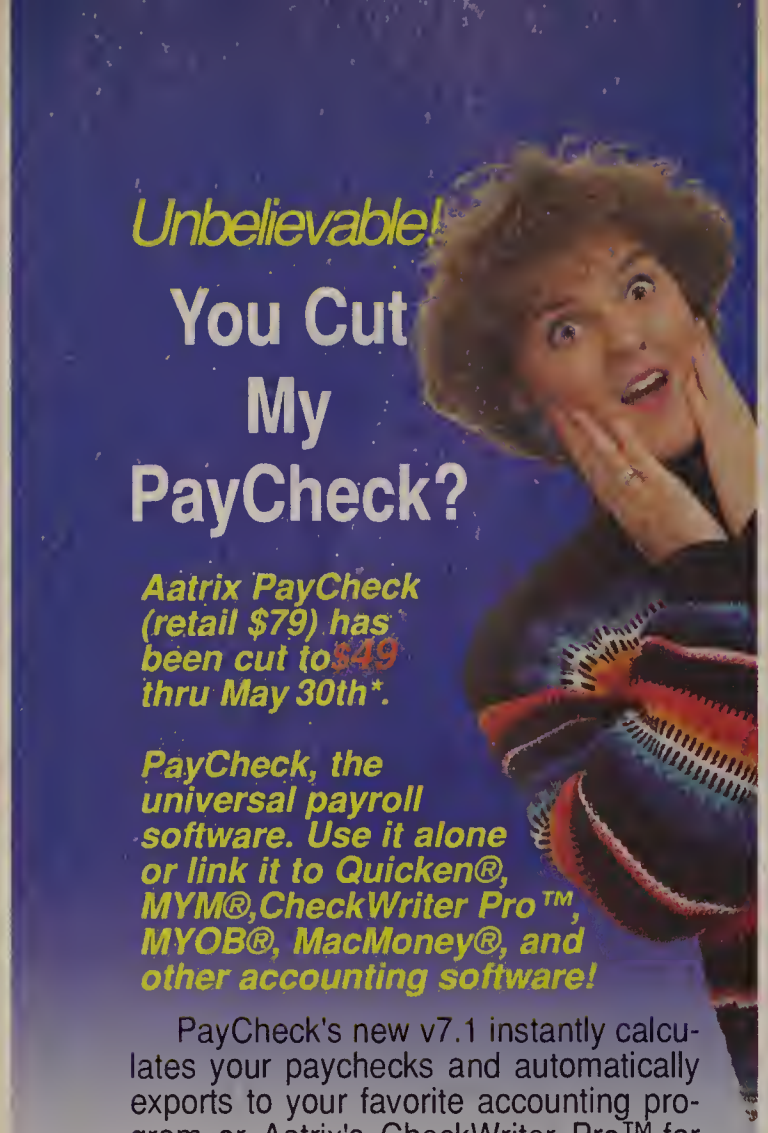
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Tetris Gold
Bet you never thought that you'd be reading about a disc of a computer game's greatest hits. Tetris Gold contains the entire line of Tetris games, including Tetris, Super Tetris, Welltris, Faces . . . Tris III, and Wordtris. There's also a ten-minute QuickTime interview with Alexey Pajitnov, the Russian creator of Tetris. Estimated street price $48. Spectrum HoloByte, 510/522-3584, 800/695-4263; fax 510/522-3587.

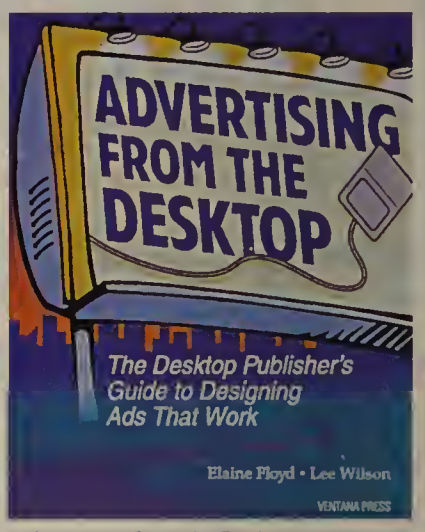
ACCESSORIES

Note Book Survival Kit
How many times have you pulled out your PowerBook while on the road, only to discover that you needed this cable or that adapter? This kit contains such late-night lifesavers as clip-lead phone-tap connectors, a T adapter to double a hotel phone jack, AC power adapters, dual-blade screwdrivers, a pocket-size AC line filter/surge suppressor, and plenty of extra phone cable. $149.95. Electronic Specialists, 508/655-1532, 800/225-4876; fax 508/653-0268.

Sentinel
To help make sure that your PowerBook doesn't grow legs and walk away, this security system combines a disk drive lock with a vinyl-coated steel cable. The lock slides into the drive slot and fastens with a key. Loop the cable around the nearest immovable object, and a would-be thief will have a harder time appropriating your favorite portable Mac. $49.95. Secure-It, 413/525-7039, 800/451-7592; fax 413/525-8807.

BOOKS

Advertising from the Desktop
Advertising is a tough, costly proposition, and this book offers advice to desktop publishers on how to create effective advertising while avoiding expensive mistakes. Authors Elaine Floyd and Lee Wilson cover marketing plans, layouts, headlines, logos, and color, and provide tips on using special effects. Readers also learn about creating fliers, exhibits, and sales materials. 426 pages. $24.95. Ventana Press, 919/942-0220, 800/743-5369; fax 919/942-1140.



Advertising from the Desktop

Guide to the Macintosh Underground
Dive into the seamy underbelly of Mac history and culture with Bob LeVitus and Michael Fraase. This book covers such topics as Mac hypertext and cyberspace, virtual sex, and Mac customization; and it includes the all-important chapter, "How to Get Free Software." An irreverent look at the people, events, and products that have contributed to the growth of the Mac. 256 pages. $19.95. Hayden Books, 317/581-3500, 800/428-5331; fax 317/581-3550.

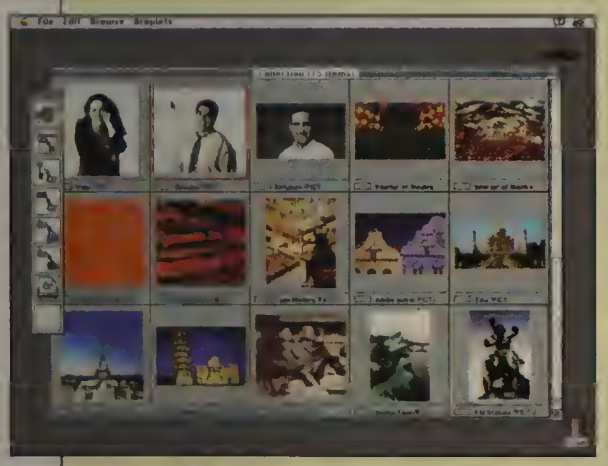
Premiere with a Passion
This book covers all of Adobe Premiere LE, 2.0, and 3.0—from capturing, assembling, and editing clips to adding effects and optimizing output. Author Michael Freerer offers a guide to transitions and filters, plus information on special-effects tricks, movie compression, project management, and edit decision lists. A disk with 16 new transitions and other plug-ins is included. 368 pages. $34.95. Peachpit Press, 510/548-4393, 800/283-9444; fax 510/548-5991.

The Quark XTensions Book
In writing about the Quark XTensions that graphic designers need and use most, author Sal Sohogian uses case studies to examine production situations. Readers will find step-by-step analyses of importing and formatting text and data, linking tables to spreadsheets, and drawing Bézier curves in QuarkXPress. An included disk contains demos and complete working copies of XTensions covered in the text. 208 pages. $29.95. Hayden Books, 317/581-3500, 800/428-5331; fax 317/581-3550. **m**

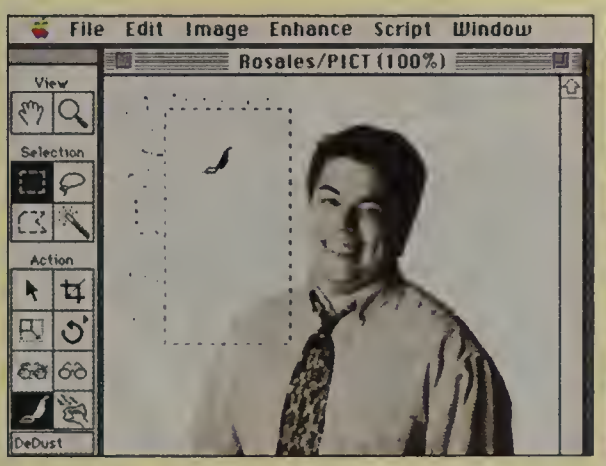
To have your product considered for inclusion in *New Products*, send an announcement with product name, description, minimum memory, peripherals required, pricing, company name, and phone number to New Products Editor, *Macworld*, 501 Second St., San Francisco, CA 94107. *Macworld* reserves the right to edit all product announcements.

A simple demonstration of PhotoFlash software.

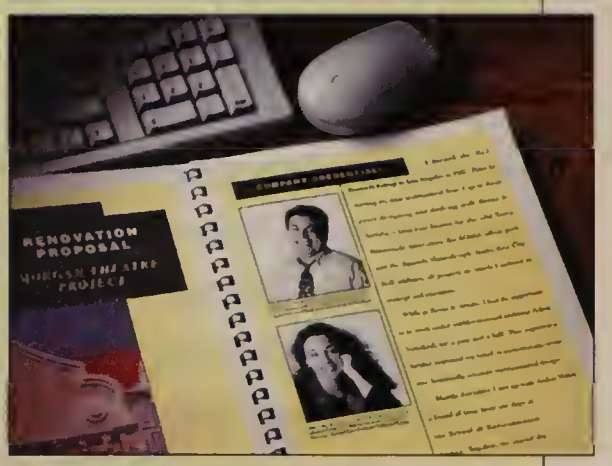
(A complicated demonstration isn't possible.)



1. Find a photo. *The PhotoFlash Browser makes it easy to view and pick a photo — they're all stored here, whether you got them from a CD, scanner or digital camera.*



2. Enhance it. *Crop, rotate and resize a picture with easy-to-use tools. Dust and scratch removal is automated, too. You can instantly preview adjustments you've made.*



3. Place it. *With a point and click, PhotoFlash automatically places the picture in your work. You can also record and automate the tasks you do most often.*



You used to have to learn a lot — and spend a lot — before you could work with photos on your computer. Now there's PhotoFlash.™ PhotoFlash is easy to use, right out of the box. It helps you organize pictures, enhance them and drop them into your work. It's fast. It's memory efficient. And it's just $279.* So if you want to make your work look great, get PhotoFlash. You'll get the picture right away.

Introducing PhotoFlash software from Apple.

Manufacturer's suggested retail price as of 1/15/94. © 1994 Apple Computer Inc. All rights reserved. Apple and the Apple logo are registered trademarks, and PhotoFlash is a trademark of Apple Computer Inc.

Introducing Director 4.0: Easier, and a whole lot c

If you really want to do the cool stuff, climb aboard our newest version of the leading multimedia authoring software for the Macintosh®. Because even if you've never worked in multimedia, Director® 4.0 can help you develop the most persuasive presentations, most inspired CD-ROM titles, most entertaining kiosks, most enlightening demos, most realistic visualizations, and most anything else you have in mind.

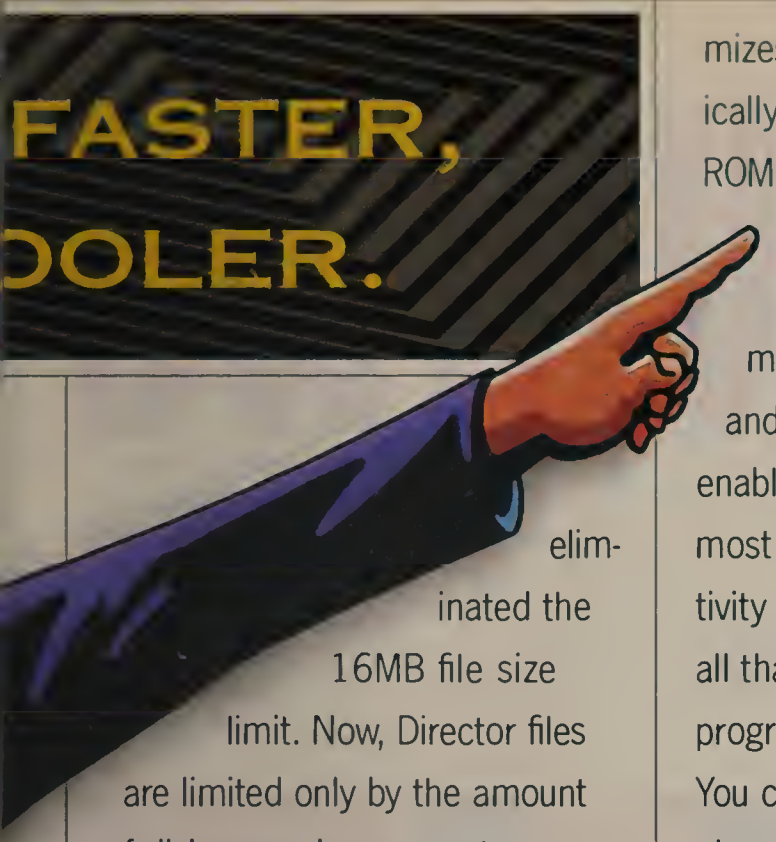
DEVELOPERS... START YOUR ENGINES.

If you've used a previous version of Director®, you'll feel the extraordinary performance of version 4.0 as soon as you start it up. If you're a first-time user, our new and improved interface will enable you to cruise through the program like a pro.

For starters, we've made it easier to organize text, graphics, music, digital video, and sound effects in the Cast, our visual database that now stores up to 32,000 media elements per movie for virtually unlimited flexibility. And you can just as easily synchronize all those Cast members in the Score, which we've upgraded to include 48 separate channels, color layout, and drag & drop editing.

To make sure you can use all this new functionality, we've even





elim-
inated the
16MB file size
limit. Now, Director files
are limited only by the amount
of disk space in your system.

PUT YOUR PRODUCTIONS INTO HIGH GEAR.

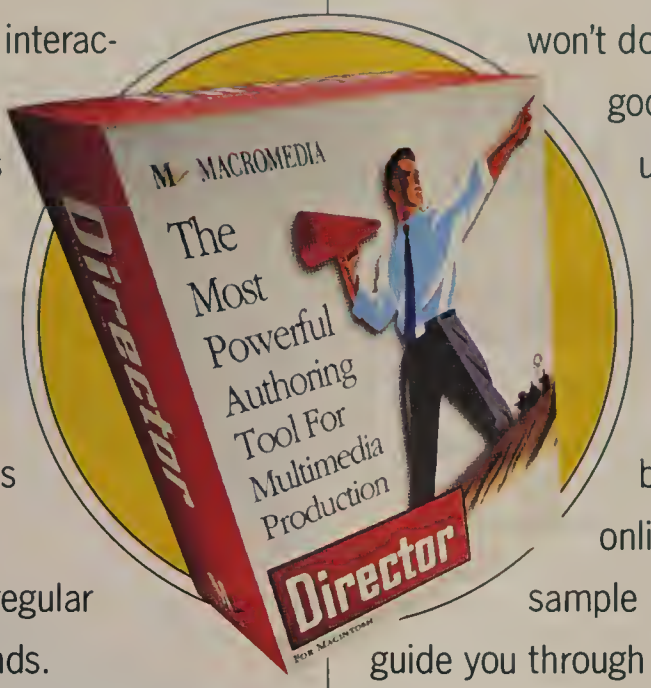
Not only is our newest version of Director more friendly, it's also a whole lot more powerful.

All that power starts with our Lingo™ command language, which you can use to write scripts that add interactivity, create presentation frameworks, control external devices, and build logic into your productions.

And since all Lingo scripts are compiled in Director 4.0, they'll run up to eight times faster!

Speaking of speed, we've actually made it possible for you to determine when individual cast members go in and out of RAM. This unique memory management feature, which we call Purge Priority, optimizes movie playback to dramatically reduce hard disk and CD-ROM access times.

What's more, our new object-oriented Lingo commands provide reusable code and simplified scripting, enabling you to add even the most complex interactivity without all that tedious programming. You can also play and manipulate Director movies within other movies using regular Lingo commands.



MOTOR FROM MAC TO WINDOWS.

Once you complete any production, Director 4.0 ensures a seamless transition to Windows™, using our new 100% binary-compatible file format with the soon-to-be-released Director for Windows. In other words, Macromedia continues to provide the industry's one-and-only set of cross-platform solutions; from Mac to Windows—plus 3DO and other popular consumer platforms—Director productions will play on your platform of choice.

We've also added high-level security features so that the code you create can't be pirated by anyone else. And that's good to know, since any production developed in Director 4.0 can be distributed royalty free to millions of users worldwide.

LEAN INTO THE (LEARNING) CURVE.

All these impressive features won't do you much good if you can't use them to their potential. That's why we've included new step-by-step tutorials, online help, and sample movies to guide you through the program.

With all that, it won't be long before you discover why the 200 professional developers who tested Director 4.0 found it to be the most exceptional authoring tool they had ever used.

If you're ready to see why, call **1-800-288-0572** for the name of the Macromedia Authorized Reseller nearest you (current Director users should call **1-800-457-1774** for the Version 4.0 Upgrade Kit).

Because you're only as cool as your next production.

MACROMEDIA

TOOLS TO POWER YOUR IDEAS.

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Circle 21 on reader service card

Reviews

Personal Laser Printers

Really Personal Laser Printers

HP LaserJet 4ML

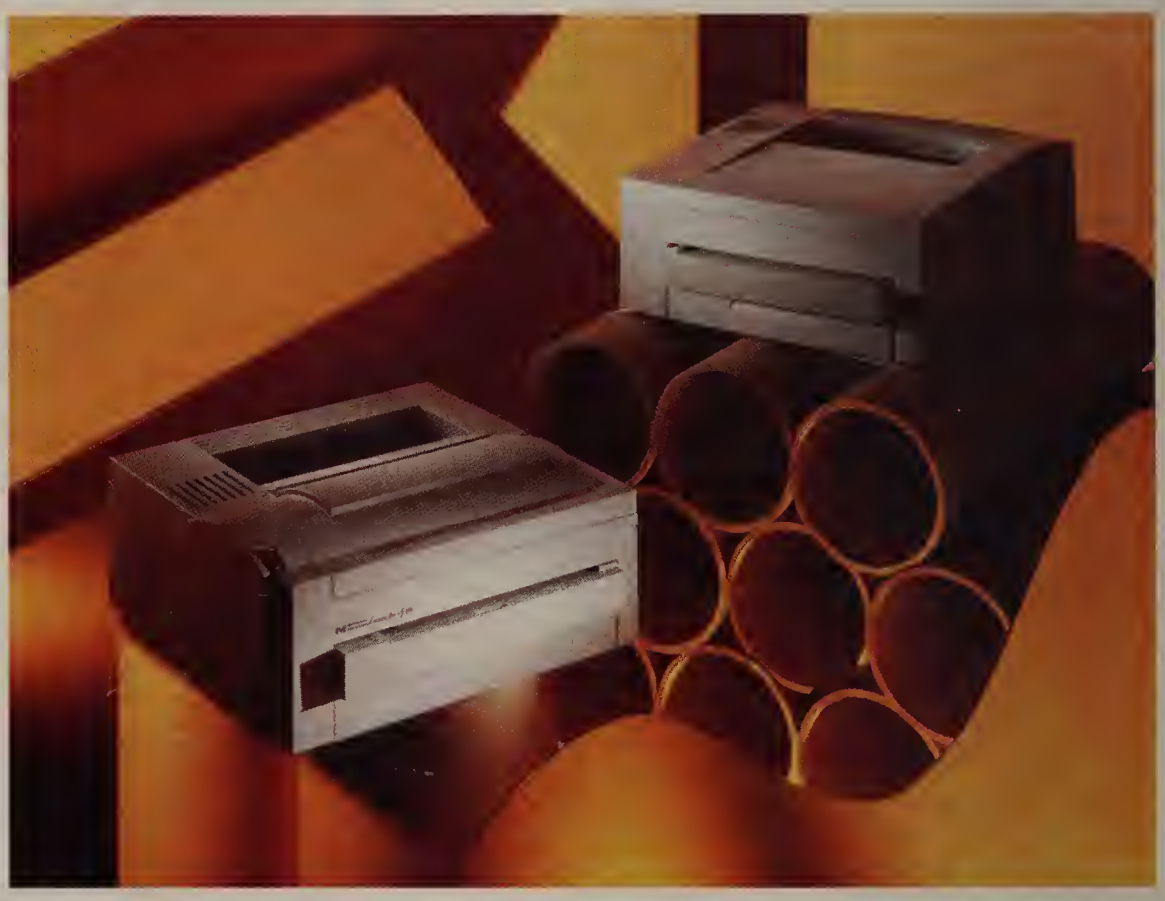
PROS: Automatic port and language switching; 4MB of RAM standard; automatic on/off; PostScript Level 2; sharp printing through Resolution Enhancement technology; draft mode saves toner; Memory Enhancement technology (MEt). **CONS:** Pricey if you don't need PC features; only expandable to 4MB of RAM; MEt not available to Macs; slight paper curl. **COMPANY:** Hewlett-Packard (800/752-0900). **LIST PRICE:** $1279.

MW ★★★

Personal LaserWriter 320

PROS: Low price; PostScript Level 2 support; good print speed; FinePrint and PhotoGrade resolution enhancement; RAM expandable to 8MB; automatic on/off. **CONS:** Awkward case shape; no way to restart without unplugging; skimpy, confusing documentation. **COMPANY:** Apple Computer (408/996-1010). **LIST PRICE:** $959.

MW ★★★★



MARK JOHANN

The HP LaserJet 4ML (left) and the Personal LaserWriter 320

I ADMIT IT. I'M ONE OF THOSE PEOPLE who still print on a ten-year-old ImageWriter because I'd rather deal with its poor resolution, noise, and pokiness than sink another penny into a printer that's anything less than perfect. Apple's Personal LaserWriter 320 and Hewlett-Packard's LaserJet 4ML may change that. Small, inexpensive, and energy-efficient, both PostScript Level 2 printers produce documents that aren't just adequate, they're actually impressive.

Based on the same 4-ppm Canon engine, these 300-dpi printers are in some ways identical. Both use microfine toner and their own resolution-enhancement methods to turn out documents that, despite any competitive claims, are indistinguishable. Apple's technique is called FinePrint; HP's is known as Resolution Enhancement technology (REt). Both methods round out the jagged edges of a curve, so that, under magnification, what you see are bumps instead of stairsteps. The practical result is that to the casual eye, the output looks as crisp, clean, and professional as anything you could get from a more expensive and memory-hungry 600-dpi printer.

Neither printer has an on/off button, however. When idling, the printers draw less than 10 watts of electricity and don't need to warm up before starting to print. As a result, a document starts printing within a few seconds of being sent to the printer, provided the document doesn't require a lot of rasterization.

But these printers differ greatly in price. If your primary machine is a PC, I recommend the more expensive 4ML over the 320. The 320, on the other hand, gets my enthusiastic approval as the perfect printer for one or a few Macs.

HP LaserJet 4ML

In a mixed marriage ("me Macintosh, you PC") the HP LaserJet 4ML can promote peaceful coexistence. Even though advertised almost exclusively as a Macintosh printer, the LaserJet 4ML offers far more advanced features to PC users.

In addition to PostScript Level 2, the printer supports HP's printing language, Enhanced PCL5. The 4ML comes with both a Bi-Tronics parallel port and a LocalTalk port neatly concealed in a back panel. Automatic port and language switching lets both Macs and PCs print

without your resetting the printer or switching ports through a software or hardware switch.

The Personal LaserWriter 320 lacks the LaserJet 4ML's draft mode, which prints light but legible copy while using, HP claims, 50 percent less toner. Still, Macintosh users can add this feature to their LaserWriter 320 with Toner Tuner, a $24.95 software utility from Working Software (408/423-5696; reviewed in *Macworld*, December 1993). According to HP, when PCs send Enhanced PCL5 print jobs to the 4ML, its Memory Enhancement technology effectively doubles printer memory through compression; but I wasn't able to test this feature.

The HP 4ML comes with 4MB of RAM. That extra RAM is probably why the printer completed many of Macworld Lab's print tests substantially faster than the LaserWriter 320 (see "LaserWriter Select 320 versus HP LaserJet 4ML"). But you can't expand the 4ML's memory beyond 4MB. That's not a problem for users who print mostly text with an occasional piece of clip art, but for a graphic artist or a small group of engineers who need to print complex documents, this is a real drawback. The lack of RAM expandability seems surprising since the 4ML is targeting small workgroups that always use more RAM, whether to print complex documents or to speed up the queue of a shared output device.

Personal LaserWriter 320

The LaserWriter 320 is a personal printer for Macs; it can also be used by small Macintosh workgroups.

Apple's printer supports only LocalTalk networks. And although you can connect both Macs and PCs to a LocalTalk network, the 320 doesn't ship with Windows or DOS drivers. Nor does the 320 support HP's PCL, a common page-description language for PC programs. Despite these drawbacks, my local computer superstore likes the design, economy, and expandability of the 320 and recommends the printer even to PC users.

The RISC-chip–based 320 ships with only 2MB of RAM, yet it printed single-font documents just a few seconds slower than the 4ML, which comes with 4MB. For individual users, 2MB should be plenty of RAM; the real difference in speed shows up when you print complex documents. Upgrading the 320's memory to 4MB should make it faster, but we were not able to test this. (2MB and 4MB memory-expansion kits are available from Apple.) With 8MB of memory, you can use the printer's built-in PhotoGrade option to print photos and graphics in a high-quality gray scale.

Alike but Different

With slim but adequate documentation it took 15 minutes to get both printers up and running. The flip-open panels, similar on both printers, hide the power and printer ports on the back of both printers; keep cords neatly in place; and make installation extremely simple. Both companies, however, fail to explain adequately the difference between PostScript and TrueType fonts or describe how to install and maintain the different fonts.

Practically the same dimensions and weight, both printers are lighter than my ImageWriter, and both fit in the same space on top of my filing cabinet. Their identical, 100-page trays (I accidentally switched them once) have a sliding guide that allows you to feed the same variety of paper sizes and types. Both printers also use the same awkward manual feeder that jams easily if you don't push your envelope in correctly.

However, I prefer HP's compact square case to the oddly shaped Apple case, which flares out at the back. You can also restart the LaserJet 4ML or output test pages by pressing a button on the front panel; with the Personal LaserWriter you must unplug to restart.

If you've been holding out for a high-quality personal printer that's fast enough to share over LocalTalk, the small inconveniences of the Personal LaserWriter 320 are eclipsed by its low price, good speed, and PostScript Level 2 support. If you primarily use a PC or work in a small mixed environment, the HP LaserJet 4ML is a good value. But if you need a printer for a single Mac or a small LocalTalk network, you should pass the 4ML by, or you'll pay for a lot of features you can't use. Solo Macs and small workgroups can get the right features at the right price, straight out of the box, with the LaserWriter. If you need expandability, you might also be better off buying additional RAM for the LaserWriter 320 than sinking that money into an extra port, PC printer language, and the bigger but unexpandable RAM of the HP 4ML.—MARGIE WYLIE

Standard Printer Features

	Apple Personal LaserWriter 320	HP LaserJet 4ML
List price	$959	$1279
Ports	LocalTalk serial	LocalTalk serial, Bi-Tronics parallel
Rated speed	4 ppm	4 ppm
Resolution	300 dpi	300 dpi
Resolution enhancement	FinePrint	REt
Printer languages	PostScript Level 2	PostScript Level 2, Enhanced PCL5
Number of fonts	35 PostScript, 35 Intellifont, 10 TrueType	35 TrueType
Auto on/off	yes	yes
RAM (base/max)	2MB/8MB	4MB/4MB
Paper capacity	100 sheets	100 sheets
Paper sizes	letter, legal, executive, A4, envelopes	letter, legal, executive, A4, envelopes
Dimensions	15.2" × 14.9" × 6.3"	14.5" × 14" × 6.5"
Weight	15.4 lbs	15 lbs
Drivers	Macintosh	Macintosh, Windows

MW LAB LaserWriter Select 320 versus HP LaserJet 4ML

Best result for each test. Times are in seconds. Shorter bars are better. Products are listed in decreasing order of overall performance.

Multiple Fonts — Print speed for a typical 7-page Microsoft Word 5.0 document with a variety of fonts, sizes, and styles.

HP LaserJet 4 ML*	209
Apple LaserWriter Select 320**	187
DEC DECLaser 1152	485

Single Font — Print speed for a 20-page Word 5.0 document with double-space, 12-point Courier text in plain, bold, and italic.

HP LaserJet 4 ML*	329
Apple LaserWriter Select 320**	335
DEC DECLaser 1152	339

MacDraw Pro — Print speed for a complex drawing with few special effects, over 2000 simple objects, and several lines of Helvetica text.

HP LaserJet 4 ML*	138
Apple LaserWriter Select 320**	200
DEC DECLaser 1152	406

FreeHand 3.1 — Print speed for a complex graphic with special PostScript effects. Illustration had nonlinear blends and Bézier curves.

HP LaserJet 4 ML*	488
Apple LaserWriter Select 320**	776
DEC DECLaser 1152	1264

PageMaker 4.2 — Print speed for a 4-page newsletter with several fonts, a MacPaint image, and 3 gray-scale TIFF images.

HP LaserJet 4 ML*	146
Apple LaserWriter Select 320**	131
DEC DECLaser 1152	258

TrueType — Print speed for a 1-page Word 5.0 document containing 4 TrueType fonts in various sizes.

HP LaserJet 4 ML*	106
Apple LaserWriter Select 320**	96
DEC DECLaser 1152	202

*With REt on **With FinePrint and PhotoGrade off

The printers were tested with a Macintosh IIci with System 7.1, 8MB of RAM, a Quantum LPS230 hard drive, AppleTalk on, and background printing off. The DECLaser printer was tested for comparison.

AppleSearch 1.0

Text Archiving and Retrieval

PROS: Easy to administer; easy to use; presents retrieved information clearly; extracts text from documents in many formats. **CONS:** No support for fields or other structure in data; need to be connected to server to perform scheduled searches. **COMPANY:** Apple Computer (408/996-1010). **DIRECT PRICE:** Server and five clients $1799; ten additional clients $499.

MW ★★★

THE MODERN OFFICE CHURNS OUT megabyte after megabyte of computer-generated memos, reports, publications, and other documents. Since some of those documents contain information that is actually important, it makes sense that you and your colleagues should be able to find them again even if they're buried inside many levels of folders. AppleSearch turns documents into a text database on a server and makes it easy for anyone in the office to search and retrieve them. (For background on competing products, see "Advances in Text Retrieval," *Macworld*, December 1993.)

AppleSearch Strengths

Macworld's programmer/analyst Dave Barrows, who provided technical assistance for this review, was frankly amazed at the ease of installing AppleSearch and getting it online. He created an AppleShare volume (the AppleSearch server can run under AppleShare or file-sharing and requires its own 68040-based Mac), launched AppleSearch and designated the volume as an Info Source, copied into the Info Source folder the documents I wanted to archive, and clicked on the Index button to create the index—the search dictionary—and to add the documents' text to the database. (The indexing process requires more than double the disk space of the original documents; plan for a gigabyte or two.) Except for indexing, all this took only three minutes. Barrows also designated drop folders where my colleagues and I could add documents to the AppleSearch volume. AppleSearch uses XTND and comes with DataViz translators for extracting text from 14 applications, including most versions of Microsoft Word, Aldus PageMaker, WordPerfect, and MacWrite (but not QuarkXPress). The translators eliminate the onerous task of extracting text manually.

To locate documents, you first create queries, called Reporters, using search functions including the Boolean AND, OR, and NOT; several wild-card operators; and proximity and adjacency controls. Search terms such as *Sculley NOT Apple* can be nested. For example, *((Sculley OR Spindler) NOT Apple)* would find documents containing either of the Apple presidents' names but not *Apple*.

AppleSearch identifies words that occur frequently in retrieved documents. You can then search using the new words to find documents that cover the same topic but that don't contain the original search words.

When performing an instant search, AppleSearch also ranks retrieved documents by how relevant they are to your query. Since this relevance ranking is based on word frequency, proximity, and other factors—and not on the documents' actual meaning—I wasn't expecting the rankings to be of much use. I was pleasantly surprised.

You can save Reporters on the server and schedule them to run at a certain time each day, or run them immediately. After running each scheduled Reporter, the AppleSearch server sends a document called an Update to your Mac. The Update document contains all new finds in a newspaper-like format, with headlines, the first paragraph or so of text, and a button to click to display the full text (see "Extra! Extra!"). There is also a floating window with a scrolling list of document titles that serves as a table of contents for the Update.

The AppleSearch engine can be incorporated into third-party applications using the AppleSearch Client Developer's Programmer's Toolkit. I did not evaluate the tool kit.

AppleSearch Weaknesses

AppleSearch has its share of flaws, and it lacks some common features available in other archiving-and-retrieval products. Because AppleSearch doesn't use fields or maintain the structure of the original document, you can't search by author, creation date, or other information commonly found in documents. For example, there is no way to retrieve documents that you wrote without also retrieving documents that simply include your name.

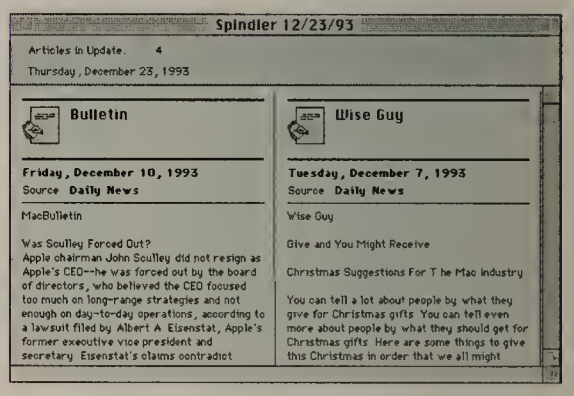
Since the search engine remains on the server, you cannot search Update documents. So to find what you are looking for, you have to read all the Update documents.

Even though the text of an instant search remains on the server, you have only minimal search capabilities. You can't, for example, search for a word that wasn't in your original query. And when you run a series of instant searches, there is no history of your search path, so it is difficult to return to a document you previously located.

Updates larger than 32K are split into 8K chunks, which means you have to click on a button to view each 8K chunk—this is not only annoying, but also slow if you're doing a live search, since the update is receiving the text from the server. Viewing 8K chunks in an Update article is much faster, since all the text has been transferred to your computer.

If you disconnect from the AppleSearch server—for example, if you turn off your machine at the end of the day or forget to reconnect to the server—scheduled Reporters will not be run while you are disconnected, even though they're stored on the server. Ideally, scheduled Reporters would always run and Updates would be stored for you on the server.

Finally, AppleSearch claims that you can use "natural-language" searching—that is, it interprets normal English sentences typed into the query box—but you might find that Apple's idea of "natural" is not the same as yours. For example, the query "Find articles about Spindler but not about Sculley" returned articles containing the following text, among other items (italics added): (1) "kiosks in malls which will specialize in hard-to-*find* batteries"; (2) "*John Sculley* and other executives from Apple"; and (3) "Additionally, the *article* implies that our product is a poor value for customers."



Extra! Extra! This Update contains four articles retrieved from an AppleSearch Info Source of recent *Macworld* articles. You click on the button next to each article's title to get the article's full text.

Overall, AppleSearch is a highly useful product for archiving and retrieving text—a function destined to become as bread-and-butter as word processing. Unfortunately, it has some rough edges, and "natural language" is more a concept than a reality. But AppleSearch does indeed retrieve information, and it presents the results in a convenient way.

—DAN LITTMAN

MacroModel

3-D Modeling Software

PROS: Straightforward interface; spline-based profile editing; fast screen redraw. **CONS:** Global resolution settings only; tricky RenderMan interface; displays only one perspective at a time; changes from spline to mesh geometry are irreversible. **COMPANY:** Macromedia (415/252-2000). **LIST PRICE:** $1495.

MW ★★★★

SPLINE-BASED DRAWING TOOLS—revolutionary in their time for flexibly artieulating two-dimensional eurves with a minimum of mathematieal deseription—produeed a similar revolution when they were adapted for three-dimensional illustration and design. Spline-based modelers introduee a third axis, along which an outline ean be lathed or extruded to establish volume. They dramatieally improved on polygonal modelers, and enabled objeet modeling to beeome more effieient and fluid.

Macromedia's MaeroModel—younger, stronger, smarter sibling of venerable Swivel 3D—ineorporates many of the earlier program's features, beginning with an elegantly simple interfaee. It supports hierarehieal and variable objeet linking—essential for ereating eompound objeets and interaetive objeet relationships like those found in moving meehanieal parts. But unlike polygon-based Swivel 3D, MaeroModel uses Bézier-splines, whose malleable eontrol points define curve tension. Retaining the 2-D profile for editing is an important MaeroModel advantage. It allows for graceful, flowing shapes and permits fast global ehanges to the model.

After creating a profile using the standard 2-D drawing tools, you ean refine it using the key profile-editing tools: the trim tool for cutting up seetions of an outline to be reshaped; the fillet tool for rounding corners; the offset tool for duplicating and nesting shapes (great for creating tube shapes and beveled text); and the add/delete–eontrol-point tool. A single working plane guides orientation and alignment of objects. Construetion points, lines, grids, and axis—enable you to build a seaffolding (whieh you ean later hide or delete) to help you plot an object's shape, size, and strueture.

Floating palettes ealled browsers let you control position, view, seale, lighting, and shading both numerieally and graphieally. Good dexterity with the view browser in is particularly essential because MaeroModel displays only one view at a time. Moreover, the rendering resolution is a property of the view and not the object; instead of allowing some parts of the model to render as wire frames and others smoothly shaded (as other modelers do), the user must toggle globally between resolutions. This ineonvenienee is partially alleviated by MaeroModel's fast screen redrawing and the ability to hide objeets. For large models, also try using eoarser adaptive-smoothing settings, which you can modify independently for each objeet.

Beyond the basic profile-extrusion operations, MaeroModel lets you nest profiles to extrude objeets with holes. Note that these eompound extrusions are not Boolean; that is, they do not employ the mathematies of eonstruetive solid geometry (CSG). But these figures do work for most basie drilling needs.

Objects ean also be swept along a path to eonstruet elaborate extrusions, suehas a eoiled spring; ean be lathed around an axis to make symmetrical shapes, as on a lathe or potter's wheel; ean be skinned over a set of profile ribs to make complex terrain or irregular surfaees; or can be made from eross seetions that combine both lathing and skinning to build nonuniform symmetrieal shapes.



MacroModel Interface This screen shows MacroModel's single-perspective interface. The model has been fully rendered with high antialiasing. The surfaces have been assigned RenderMan presets but only display a representative color.

For more preeise seulpting, MaeroModel can also diseard the original defining geometry and drop to a patehmesh description. This eonverts the entire surfaee of the objeet to a matrix of editable spline eontrol points, enabling the user to define more loealized eharaeteristies such as ridges and indentations without globally affeeting the shape of the object. Simplifying the geometry further gets you to a polymesh deseription of the object more akin to what you see with the polygonal modelers mentioned earlier. Patehmesh geometry retains a lot of rubbery elastieity and tension between eontrol points, while polymesh geometry is more like elay, with very localized reshaping properties. This editing level gives you individual control over all polygonal vertiees, but the spline relationships no longer apply. Maeromedia reeommends duplicating objeets before you ehange the level of geometry, sinee you eannot undo these operations.

The ability to manipulate eontrol points together or separately gives the user a remarkable degree of eontrol over objeet deformation. MaeroModel gives you highly interaetive squash and streteh eapabilities that let you bend, twist, and warp models as though they were made of soft wax. The deformations are also quite useful for creating helieal or spiral shapes, sueh as the threads of a serew.

Impressive as it is, MacroModel is not a 3-D panaeea. The product was designed for a wide variety of modeling functions and is not tailored for the exacting speeifications of arehiteetural or meehanical design. It will, however, import EPS, RIB, DXF, and ClarisCAD files produeed in other programs; MaeroModel exports RIB, DXF, TIFF, and PICT file formats. And though MaeroModel does not itself display surfaee texture, it sports a deeent MaeRenderMan interfaee for ealling out and adjusting surfaee and lighting shaders. Models ean then be exported as RIB files and photo-realistieally rendered. Also, if you ean get the hang of editing RIB files direetly, you ean add operations, such as putting holes in a bowling ball, and RenderMan ean interpret them for final rendering.

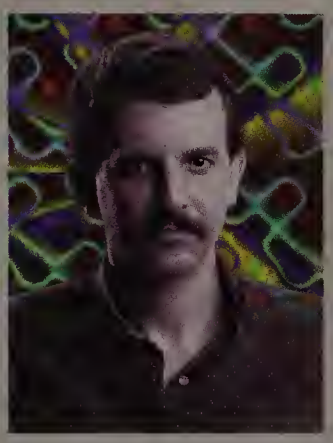
MacroModel is also available bundled with MacRenderMan for $1795, and with the animation paekage Three-D (which has its own rendering engine, RenderWorks) for $2495.

So what was onee a void has been paved with polymesh. While the search for the ultimate Maeintosh modeler eontinues, MaeroModel deserves a lot of credit for making the Mae's inner spaee a more pleasant plaee to work. The potential of the MaeroModel engine has not been fully tapped, and version 2.0 should see signifieant new eontrols not only for surfaee appearance but for physieal attributes and behaviors as well (good news for animators). Despite some shortcomings, MacroModel is a solid resource to have along when you venture out into 3-D space.—AVI HOFFER

Kai's Power Tools™ 2.0

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Lee Varis
Digital Artist



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About the Image. Renowned digital artist/photographer Lee Varis of Los Angeles, Calif., filled in the world of "The Hermit", one in his series of haunting tarot card images, using Kai's Power Tools. KPT's Gradient Designer produced the glowing orb and its cascading rays, KPT Texture Explorer created the card's border, while the KPT Sharpen Intensity filter brought out details in the rock. To build the dream-like landscape on the horizon, Varis used a beta version of the awesome KPT New World Explorer™ (codename "Bryce"), a powerful natural and supernatural 3-D landscape creation program—coming soon from HSC Software.

MacWEEK ◆◆◆◆◆ MacUser ◆◆◆◆◆ NewMedia Magazine Rated Awesome June 1993 ★★★★★ Publish March 1994

HSC SOFTWARE

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Circle 5 on reader service card

DesignWorkshop 1.0

3-D Modeling Software

PROS: Approachable 3-D interface; easy-to-use modeling tools. **CONS:** Interminably slow solar studies; no dynamic linking of multiple views. **COMPANY:** Artifice (503/345-7421). **LIST PRICE:** $895.

MW ★★★

ARCHITECTS HAVE BEEN SLOW TO adopt computer-aided 3-D design, but the complexity of much 3-D software has done little to entice them. Let's face it—programs with steep learning curves require motivation. DesignWorkshop may help overcome this reticence.

A 3-D, floating-point accurate solids modeler tailored for architectural applications, DesignWorkshop offers a clear, straightforward interface that is exceptionally easy to learn and use. The overall look is reminiscent of the original MacDraw but expanded to encompass navigation in three dimensions. And DesignWorkshop offers a concise feature set that focuses on architectural functions and leaves out nonessentials.

DesignWorkshop's interface revolves around a crosshair cursor that you move freely to any location in 3-D space by using the option key to toggle mouse inputs to the vertical (z) axis. As the cursor moves, color-coded guidelines extend from the crosshairs along each axis to assist in positioning. Tool-palette buttons let you realign the working plane to any orientation, or to match the surface of a specific object, expediting the construction of unconventional shapes.

Object-creation tools work similarly. The tool palette holds line, rectangle, circle, arc, and polyline tools that behave like 2-D drawing tools and extrude objects with the option-key modifier. For example, rectangles can be extruded into slabs. DesignWorkshop also offers a polywall tool, and a block tool that produces editable solid objects, similar to Architrion's building blocks.

The model can be displayed as a wire frame, with hidden lines removed, or as a shaded solid. Perspective view is the default, but axonometric, plan, and elevation views are also available. DesignWorkshop displays objects located above the horizontal axis with projection lines to the ground plane to better indicate their location in space. When you use an alternate working plane, such as the vertical, additional projection lines refer to both the ground and working planes.

You can examine the model from any location in 3-D space by dragging the eye and look tools. Using the eye tool to view a wire-frame model produces a fairly brisk response. Unfortunately, shaded models revert to wire-frame models during eye-tool dragging and incur surface-recalculation delays.

DesignWorkshop supports multiple view windows, but it does not dynamically update them. For example, changes wrought in an elevation-view window do not appear in a perspective-view window until it becomes active. And when you use multiple views, object handles sometimes get misplaced as you switch back and forth. Changing the eye point restores them and no model damage results, but it's disconcerting nonetheless.

Space-Jump is an excellent 3-D navigation facility that recognizes the actual 3-D location of objects within the context of their visual 2-D on-screen position. Align the cursor over the handle of a selected object, press the spacebar key, and the cursor jumps to the location of the handle in 3-D space. To reposition that object, just click on it and drag it; to reshape it, tug on its control handles.

Other object-editing tools let you reshape solids, manipulate individual object faces, trim solids, and punch openings in walls or slabs. And menu commands expand the capabilities of the basic tools. For example, the Wallify command can transform a solid object into a room with walls of user-defined thickness. And the arc tool in conjunction with the circular-duplication function enables you to create domes, spires, and lathed details.

Using DesignWorkshop's tools and functions requires awareness of the current view and working orientation. For instance, to build a dome, it helps to be in vertical-plane orientation when drawing the arc, but you need to change to a Plan view to define the center of rotation for the circular-duplication function. Unfortunately, accessing most editing functions and changing views requires the use of menus. Keyboard commands or a small floating palette to access these functions would be helpful.

DesignWorkshop offers an excellent daylight feature that produces shadows with reasonable efficiency, but its renderings are limited to flat shadings that are adequate for architectural illustrations but fall well short of photo-realism. Aside from the sun, no other light sources are available; to study interior lighting schemes, you must transfer the model to a more competent renderer.

Although not an animator per se, DesignWorkshop lets you create a walk-through of a model by rendering a sequence of saved views as a QuickTime movie. Solar studies illustrating the movement of shadows over time are also possible. In either case, DesignWorkshop's lack of a tweening capability results in choppy motion—OK for design analysis but not for cinematic presentation. However, rendering a QuickTime solar study is so painfully slow, you'd expect to see a ray tracing at the end. Worse, the process completely takes over the Mac,



3-D Simplicity DesignWorkshop offers a comfortable 3-D–modeling environment.

even locking out the Finder under System 7. This needs correcting.

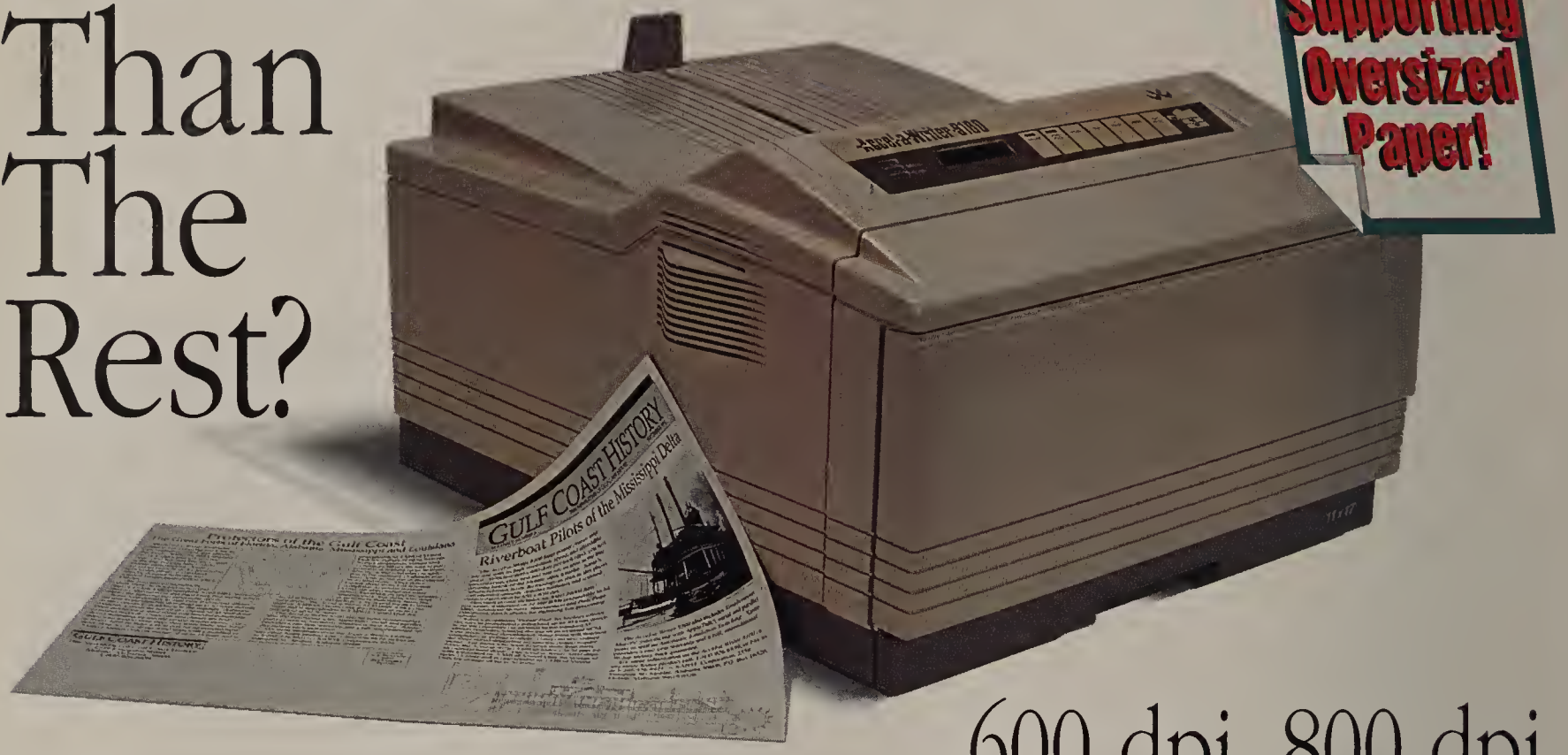
DesignWorkshop imports DXF, PICT, ClarisCAD, and Architrion files. It exports in DXF, PICT, the Unix-based program Radiance, and ClarisCAD formats. Artifice is currently negotiating links to other Mac drafting packages. Given DesignWorkshop's visualization limitations, avenues to other rendering and animation packages should also be explored. RIB file support would be a good place to start.

The manual is adequate but suffers a bit from academic-style prose and a textbooklike organization that locates the quick-start tutorial after 100 pages of fundamentals. However, the techniques section, detailing the construction of architectural elements, is very useful.

Despite its weaknesses, DesignWorkshop is an excellent tool for architectural design-conceptualization. (At press time, Artifice announced a 1.1 upgrade to DesignWorkshop.) Unfortunately, the program is priced several hundred dollars higher than Macromedia's ModelShop II, Virtus WalkThrough, or Alias's Upfront—modelers that may be less intuitive but aren't that tough to learn, either. Still, architects who till now have balked at 3-D modeling may find DesignWorkshop's accessible interface and versatile modeling environment worth the price.

—CARLOS DOMINGO MARTINEZ

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Paint Alchemy 1.0

Plug-in Graphic Effects

PROS: Powerful filters; many customizing options; plug-ins work with various graphics and animation applications. **CONS:** Calculation-intensive; large images slow to filter; hard to keep track of multiple parameter adjustments; no scaling. **COMPANY:** Xaos Tools (415/487-7000). **LIST PRICE:** $99; additional brush set $19.99.

MW ★★★★

PLUG-IN ARCHITECTURE HAS BEEN a real windfall for digital artists. Third-party plug-ins load into the main application (such as Adobe Photoshop and other image processors), providing filtering, file-format conversion, and other functions. Xaos Tools' Paint Alchemy is virtually a super-plug-in, giving users the ability to create an infinite variety of looks.

When called up from the host application's filter menu, Paint Alchemy resembles a small application with its own compact interface. It comes with 36 brushes and 75 preset styles such as vortex and threads, and you can purchase 50 additional brushes for $19.99. These presets, however, are only a point of departure for daring alchemists. Parameter "filing cards," which group setting categories such as color, stroke size, opacity, brush angle, and brush shape, let you numerically control via slider every variable in the brushing engine. The brushing engine lets you save any gray-scale PICT as a brushstroke and apply it across an image. Other parameter controls let you introduce randomness and variation into your brush to simulate the look of traditional painting.

You can set a brush to change angle or opacity according to hue, saturation, or brightness so that it appears to interact intelligently with a source image. For example, you can set the bright green grass of an image to receive long, angular strokes while the pale blue sky gets small, even strokes. Varying stroke density and the way the strokes layer enables you to create three-dimensional textures such as fur and bubbles. Users of Adobe Premiere and CoSA After Effects can take advantage of Paint Alchemy's ability to randomize a brush's behavior across time, using it to create dynamic animation effects.

The product is blemished by slow processing speed, the inability to automatically scale filters, and an overly complex interface. Because Paint Alchemy's effects are calculation-intensive, large images can take a while to process; you might easily wait 45 minutes for a 10MB file to finish, though Macs with a floating-point unit will fare better than those without. By working intelligently you can cut down on a great deal of hang time. For example, lowering brush density as much as possible reduces the number of strokes needed to produce the effect. According to Xaos Tools, a patch that doubles processing speed (and adds a few other enhancements) will be available by the time you read this.

The absence of scaling is a significant hindrance to people who like to experiment using a low-resolution image and then operate on the full-resolution image when the look has been worked out. Because brush size is fixed, each stroke covers a larger area on a lower-resolution image. You can get around this by creating a higher-resolution brush for a high-resolution image. Finally, Paint Alchemy's interface would benefit from a summary listing of all the parameter settings, so that users could easily keep track of their modifications.

Paint Alchemy's phenomenal results outweigh a bit of CPU drag; besides, the company promises to release a patch soon that significantly improves speed. Ultimately Paint Alchemy is a professional tool, but at a suggested retail price of $99, it's a tremendous value that both casual users and professional artists can use to design a little chaos into their work.—AVI HOFFER



The Alchemist's Toolbox Five "file cards" for each Paint Alchemy brush effect let you fine-tune individual parameters. This photographic image of a lighthouse has been painted with the Soft Pencil Dark (lower left); the preview window (lower right) shows how the Spatula Crosshatch style would affect the marqueed selection of the sky.

RAM Doubler 1.0.1

RAM-Enhancement Software

PROS: Inexpensive System extension doubles available RAM for most Macintosh users; transparent interface. **CONS:** Requires an MMU and at least 4MB of RAM; applications must be 32-bit clean; can't allocate more than total physical RAM to any single application; can't run with virtual memory. **COMPANY:** Connectix Corporation (415/571-5100). **LIST PRICE:** $99; for registered users of any Connectix product $49.

MW ★★★★

THERE'S AN OLD SAW, "NEVER TOO rich or too thin." And one might add, "never enough RAM." A simple System extension that promises to double your RAM for less than $100 sounds too good to be true, right? Well, RAM Doubler from Connectix does just that for many Macintosh users.

Inevitably, there are restrictions. RAM Doubler requires a memory-management unit (MMU), so you must have at least a 68030 Mac, or a 68020 that's been upgraded with a 68030 accelerator, a 68040 accelerator, or a 68851 PMMU. RAM Doubler's magic also requires System 7 and 4MB or more of physical RAM. Owners of older Macs and those with less than 4MB of RAM may want to consider OptiMem from Jump Development Group (see *Reviews*, March 1994).

In addition, the applications run must be 32-bit clean; RAM Doubler does not work properly in 24-bit addressing mode. And don't expect to dedicate all of this newfound RAM capacity to a single memory-hungry application such as Adobe Photoshop, Adobe Premiere, or a 3-D rendering program. You can't allot more memory to any single application than is available as physical RAM. (Connectix recommends leaving applications at their suggested memory settings.) You can't employ additional memory-management schemes such as Apple's virtual memory or Connectix's Virtual. Finally, RAM Doubler doesn't work with more than 128MB of physical RAM. All this said, RAM Doubler does effectively double the available RAM for the many Macintosh users who fit the program's profile.

Using RAM Doubler couldn't be easier. The modest 45K program sports the ultimate interface: none—no control panel or menus. You simply open twice the number of applications without incurring the dread "out of memory" message.

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continues

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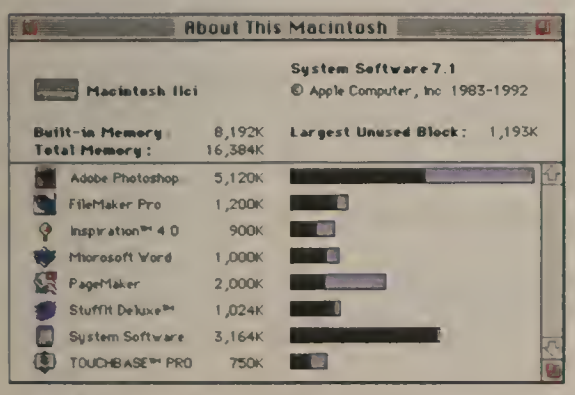
Booting my 8MB Mac IIci with RAM Doubler installed takes about 5 percent (6 seconds) longer than usual. Most normal operations take a second or two longer, but if I run a suite of applications that uses more than 14MB, some operations—such as copying and pasting a large file—take up to 10 percent longer. For me, it's worth waiting those extra seconds.

To accomplish its digital trick, RAM Doubler relies on several techniques. The most important involves a dynamic mapping of the RAM allocated to individual applications. An application allotted 4MB, say, is often using only half that amount. RAM Doubler takes charge of the unused memory and applies it where it is currently needed most.

RAM Doubler also compresses routines stored in RAM that are unlikely to be called again—code used to open an application, for instance. Finally, Connectix requires that users with only 4MB to 6MB of physical RAM have a hard disk, because in low-memory situations RAM Doubler may store some low-use routines to the much slower hard disk, à la traditional virtual-memory schemes.

RAM Doubler 1.0 was incompatible with a few applications—chief among them 4D, Frontier, and Now Startup Manager. Patches from the developers of these applications, together with the 1.0.1 version of RAM Doubler, seem to have solved these problems. However, RAM Doubler is still incompatible with the Radius Rocket and Fusion Data Systems' TokaMac products, since they are not virtual-memory-friendly. To run applications that have a similar distaste for virtual-memory schemes—the popular CD-ROM game Myst, for example—you can disable RAM Doubler when booting by holding down the ~ (tilde) key.

RAM prices may head back down a bit, but meanwhile we're all still looking for ways to make better use of our current investments in SIMMs. With a street price well below $100 and a 30-day money-back guarantee, RAM Doubler is worth checking out.—SUZANNE STEFANAC



Double Your Fun RAM Doubler takes charge of memory not currently being used by applications (the light portion of the bars) and dynamically applies it where it is needed most.

Kai's Power Tools 2.0a

Photoshop Plug-Ins

PROS: Revised documentation; previews in all dialog boxes; enhanced real-time options; allows you to temporarily protect textures; simplified fractal explorer; stunning range of visual capabilities; no more Einstein button. **CONS:** Possible problem when pressing keys to adjust filter strength. **COMPANY:** HSC Software (310/392-8441). **LIST PRICE:** $199.

MW ★★★★★

KAI'S POWER TOOLS (KPT) WAS ONE of the most exciting graphics applications to debut last year. Inexpensive and unquestionably powerful, it broadened the capabilities of Photoshop and programs that support Photoshop's plug-in specifications. But it had its problems. Its mesmerizing interface and reliance on unfamiliar controls made it a trial for new users; the documentation was sketchy at best and indecipherable at worst.

Kai's Power Tools 2.0 is even more extraordinary than the first version, sporting several new filters as well as redesigned gradient, texture, and fractal explorers. And while the interface still looks like it belongs on the console of an alien spaceship, the documentation has been completely revised. I've always maintained that the interface makes sense once you come to terms with it.

KPT 2.0 includes four entirely new filters. Three of these—Page Curl, which adds a curled corner to an image; Selection Info, which measures the number of pixels in a selection; and Fade Contrast, which decreases the range of colors in an image—are among KPT's least interesting functions. The fourth, Seamless Welder, is easily the most useful.

Version 2.0 lets you modify the performance of just about any filter by pressing a number or letter key. For example, to apply the Sharpen Intensity filter at full strength, you press the 0 key while choosing the command. To lessen the impact of the filter, press 9 or lower. This is an intuitive solution and cuts down on steps and dialog boxes. Before applying a filter to a floating selection, however, be sure to select a neutral tool, such as the hand tool. If a selection tool is active, Photoshop intercepts the number key and changes the opacity of the floating selection as well as the strength of the filter.

The majority of KPT's capabilities are packed into its gradient, texture, and fractal explorers. The gradient explorers now include several previewing options. A host of real-time controls allow you to change the center and angle of a gradation, blur neighboring colors, and move colors inside the gradient bar.

In the texture explorer, you can now choose between five tile sizes or simply enlarge a tile to fit the current selection. You can temporarily protect a texture from being randomized by option-clicking on a tile preview. And you can use the colors in any saved gradation as a starting point for a texture cycle.

KPT 2.0 has combined four separate fractal explorers into a single dialog box. And while creating and applying fractals is complicated, KPT's designers have condensed a lot of power into remarkably few controls. (They've even *labeled* many of the controls.) You can zoom in on the fractal preview, adjust the amount of detail, change the spiral and radial wrapping, introduce colors from saved gradations, and navigate inside Mandelbrot and Julia spaces, all in real time and without entering a single numerical value.



Is That You, Mom? After using the Seamless Welder filter to establish the repeating background pattern, I applied the Scatter Horizontal, Find Edges Charcoal, and Sharpen Intensity filters to a floating selection and multiplied it with the underlying original. I used the Gradient Designer to apply a radial procedural blend to the background pattern. (Original image from 21st Century Media's PhotoDisc Volume 5 collection.)

Kai's Power Tools is a phenomenally powerful suite of plug-ins with an addictive quality typically associated with arcade games. There's no end to the automated effects you can generate, the ways in which you can apply them, and the artwork you can create. I'm not sure KPT is the best tool for getting work done on a deadline. But there's nothing like it for experimenting and as we all know, without experimentation, art becomes dreadfully repetitive.—DEKE McCLELLAND

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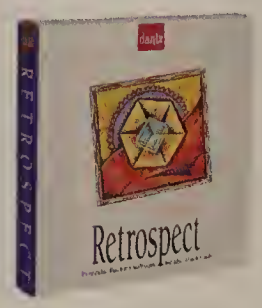
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Circle 26 on reader service card

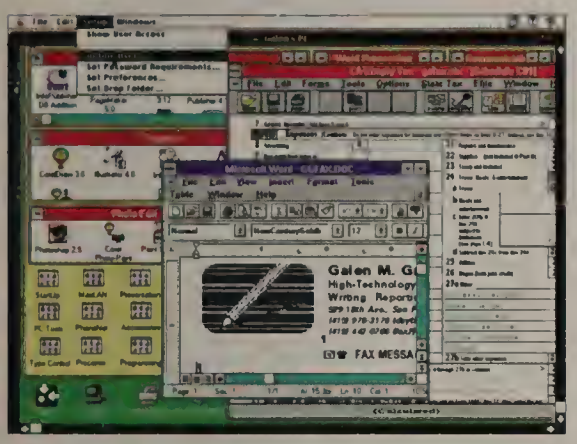
Timbuktu Pro

Terminal Emulation

PROS: Adds TCP/IP support for Mac nodes; adds new controls over an observed or controlled computer. **CONS:** Some features not available with Windows systems; no file mapping during cross-platform transfers. **COMPANY:** Farallon Computing (510/814-5000). **LIST PRICE:** $199; 10 nodes $999; 30 nodes $1999.

MW ★★★★

TIMBUKTU HAS GONE FROM 5.0 TO Pro 1.0, but the name change overstates the product revision. This could easily have been called Timbuktu 5.5, since it's a welcome but not groundbreaking enhancement. Like its previous version, Timbuktu Pro offers easy file exchange among Macs and Windows PCs, plus the ability to observe or control other users' screens (helpful for in-house tech support). But Timbuktu Pro adds two main enhancements. One is support for TCP/IP networks—even for the Internet



Faster Control Timbuktu Pro more quickly displays the screen of another Mac or Windows PC being observed or controlled. Also, the program now supports TCP/IP networks (for Macs only).

(the previous versions supported only LocalTalk)—although Timbuktu Pro supports only Macs over TCP/IP, not Windows nodes. (The reason is that the new Windows version of Timbuktu does not offer the Pro enhancements.) The other improvement is noticeably faster screen redraw (about 20 percent overall) when observing or controlling another system. One or the other of these changes alone makes upgrading worthwhile.

You'll also notice some subtle changes if you use the observe or control options with other Macs. These include two new icons in the border around the remote Mac's screen. One lets you switch between monitors on a Mac that has more than one monitor connected; the other lets you capture a screen image of the observed or controlled system.

Timbuktu Pro also puts a small program called Timbuktu Sender on your desktop. It's essentially a shortcut for sending files to another system—you can even drag and drop files onto the Sender icon, rather than launching the program and then selecting the files to send. And with Pro's new group-send feature, you can configure Pro to send a file to multiple users at once. Other enhancements include support for Apple's PowerTalk mail extension and securer methods of restricting access to authorized users. While Timbuktu Pro supports System 6.0.5 and later, you'll need System 7 for these three enhancements.

Timbuktu Pro retains a few limitations from its earlier versions, mainly the limited connection document and the inability to assign appropriate file creators and types to Windows files transferred to the Mac. The connection document saves the path and connection type (such as control, exchange, or observe) that you establish for a particular system—even connections that use Apple Remote Access. But it can't do more than reopen that connection. I'd like connection documents to remember the path on the connected system so that I can quickly connect to that system and move to the desired disk or folder. The creator assignment has traditionally been weak in both Timbuktu and its PhoneNet software for PCs. And unfortunately, DOS-mounting utilities such as Dayna Communications' DOS Mounter Plus and Apple's Macintosh PC Exchange can't pick up the slack, since the former supports only Novell NetWare connections and the latter only floppies and removable media.

Timbuktu Pro also has some problems you should be aware of before you buy. One, Pro conflicts with On Technology's Meeting Maker, which is known to conflict with several other products as well. Two, a conflict with CE Software's QuickMail 2.5 client causes sporadic system lockups; you'll need to update to QuickMail 2.6 to run Timbuktu Pro. Also, on *Macworld*'s network, using Timbuktu Pro resulted in the sporadic disappearance of the menu bar in many applications. This did not occur on remote computers, and we could not pinpoint the cause.

Timbuktu has improved in this new incarnation, even if the change of name and version number seems to promise a greater degree of change than is actually offered. But who cares? Farallon's Timbuktu Pro is a must-have for in-house technical-support staff and people who need direct connections to computer systems on a variety of networks.

—GALEN GRUMAN

Map II 1.5

Geographical Information System

PROS: Inexpensive; simple tools for manipulating maps and images are easy to use **CONS:** Balky color controls; limited geographical precision. **COMPANY:** ThinkSpace (519/661-4006). **LIST PRICE:** $395.

MW ★★★

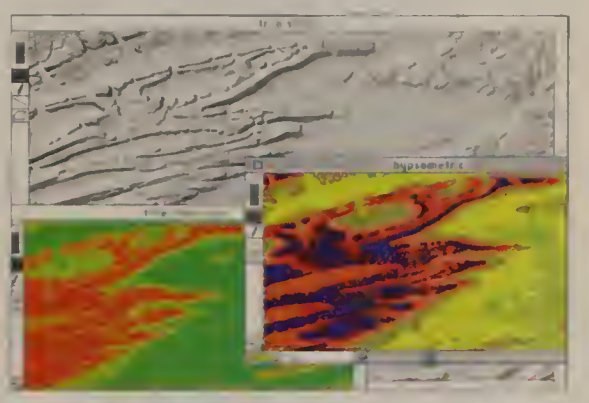
A GEOGRAPHICAL INFORMATION system (GIS) is a program for handling spatial data quickly and efficiently, and nowadays nobody doesn't do GIS, it seems. A GIS enables you to combine several maps to produce a new one that explores some important relationship. Urban managers, business planners, environmental scientists, zoning boards—anybody who works with maps will soon be conversant in GIS, or get left behind.

Map II bills itself as a map processor. In Map II, all map data is raster-based; that is, every map is treated like a big grid with a numerical value in every cell to represent what's present at that spot on the map—a certain elevation, tax assessment, or crop, for example.

Getting your data into the program is probably the hardest part of the whole enterprise—typical of GIS. Map II works well with scanned images, spreadsheet data, and simple matrices in most any format. It also accepts the USGS digital elevation files, as long as their formatting is intact. This format sensitivity is unfortunate: these elevation files are wonderful and cheap, but it's easy to introduce formatting errors while extracting them from tape or network.

To make a new map that will contain the results of some mathematical treatment of the maps you started with, you view your maps in individual windows, in your choice of size and scale. Then you choose from a menu of operations that filter, combine, overlay, or regrid the

continues



Processed Maps Map II offers many choices for coloring and embellishing a map or an image, but getting consistency among maps is a chore

original maps. After a bit, the new map appears in a new window. Some operations are inexplicably slow. A Mac IIsi with the recommended 2MB of RAM dedicated to Map II might chuff away for ten minutes doing a simple numerical operation on a 200K image, and allocating more RAM doesn't help.

Once you grasp GIS rhetoric, Map II is easy to use and even fun. Maps—or satellite imagery, or aerial photos, or any other gridded data—can be manipulated in many ways. For example, decrease the number of data classes or the number of cells to simplify a map. Subtract the numerical values of two maps (showing rainfall or population, for example) to get a new map showing change over time. Or show the places where two types of features occur together—locate bridges by mapping where highways meet streams. You can use Map II's image-editing tools to emphasize topographic relief, or types of businesses, or environmental hazards. You can overlay a satellite image on a city map for an interesting composite.

Loaded onto a PowerBook, Map II makes a handy tool for fieldwork. Take it on the road to record the locations of convenience stores, or carry it into the mountains to map stream acidity. You can enter data directly onto the map and see your results while still doing your research, so you can immediately see where you need to augment or recheck your data.

Map II produces maps that are more visually appealing than geographically precise. The color tool lets you point-and-choose various strange rainbows to highlight your data, but there is no easy way to reproduce colors consistently. You cannot specify colors from a file, and the on-screen tool doesn't remember your previous choices. The geometric characteristics of Map II cripple the maps' geographic precision, as well. All maps must be made of square cells, and there's no straightforward way to stretch dimensions. Map II simply cannot represent map projections; that's not a problem for small areas, but it is unfortunate for a mapping program to introduce inevitable error. The program also lacks a database interface and useful statistical functions.

Nevertheless, Map II is well structured and has most of the functions a simple GIS needs. Manuals are clearly thought-out and readable. The package includes a HyperCard-based map organizer; a tutorial; and a sample data set of topography, land use, and satellite imagery of Ontario, Canada. Map II is an elegant tool—highly suitable for introductory instruction in GIS and for alert first-time users who just like maps.

—BEN MARSH

Virex 5.0

Virus-Protection Software

PROS: SpeedScan feature rapidly scans for viruses with no noticeable performance drag; scans for all known Mac viruses and Trojan horses. **CONS:** Cannot scan StuffIt archives for viruses; costly automatic update service. **COMPANY:** Datawatch Corporation (919/549-0711). **LIST PRICE:** $99.95; annual update service $75.

MW ★★★★

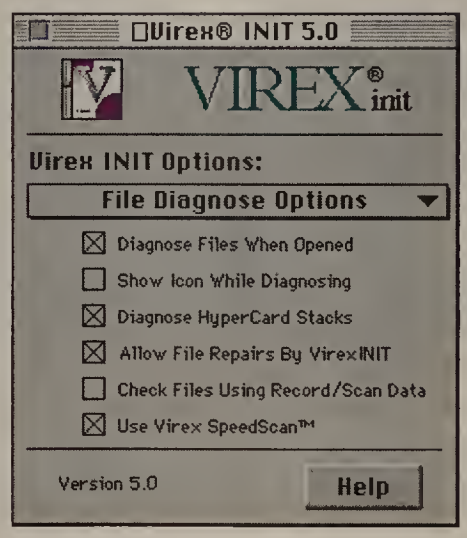
IF YOU BACK UP YOUR DATA, LOCK your master software disks, and get a good virus-protection program, you don't need to fear sometimes-harmful computer viruses. But running a full-featured virus-detection utility on your Mac is a trade-off. You pay the price in reduced performance when booting your Mac and launching applications, as well as every time you pop a floppy disk into the drive.

Datawatch's Virex 5.0 will seek out Macintosh viruses and Trojan horses and can even be configured to look for evidence of unknown virus strains. It also has a new feature, SpeedScan, that's designed to deal head-on with the slowdown that virus-protection software causes.

Virex 5.0 comes with a start-up disk in both 800K and high-density (1.4MB) versions. The disks include a ScanStaller application that scans and disinfects your mounted drives before it installs Virex.

The Virex control panel sets basic functions such as the type of protection, whether to scan floppy disks, and the kind of warning to give if a virus is detected. You can password-protect the Virex control panel, which prevents changes in preference settings, and even lock it, so no one can remove it from the System Folder (as long as extensions are not disabled).

The Virex application provides a Record/Scan feature, which makes a log of your software. Each time Virex scans your files, it reports any changes in code resources since the log was made. In theory, this function helps you locate programs that may have been modified by a virus. But some normal system operations (such as switching preferences) may change a program, and you're apt to get more false alarms than real ones.



First Line of Protection Virex can be configured to provide automatic background detection of viruses.

Virex's protection options include an attempt to repair virus-infected files, but there's no guarantee that a repaired file will work as well as an uninfected one.

Datawatch claims (and my own tests with other commercial virus software largely confirm) that the new version of Virex can scan a disk up to 25 times faster than other programs due to its SpeedScan feature. The first time SpeedScan inspects a disk for viruses, it creates a setup file called Virex SpeedScan on your disk. Although the initial setup can take a couple of minutes, subsequent scans, even of a large hard drive, are a matter of seconds. Scanning several large hard drive partitions, ranging from 203MB to 235MB and with 2000 to 3000 files, took anywhere from 9 to 40 seconds each. By comparison, Symantec's SAM 3.5.9 took from 5 to 12 minutes to scan the same drives.

In normal use, Virex's SpeedScan feature is quite unobtrusive. I noticed little if any delay in booting my Mac or in launching applications. SpeedScan doesn't benefit floppy disk scans very much, but floppy disk inspection is also noticeably zippier than with SAM.

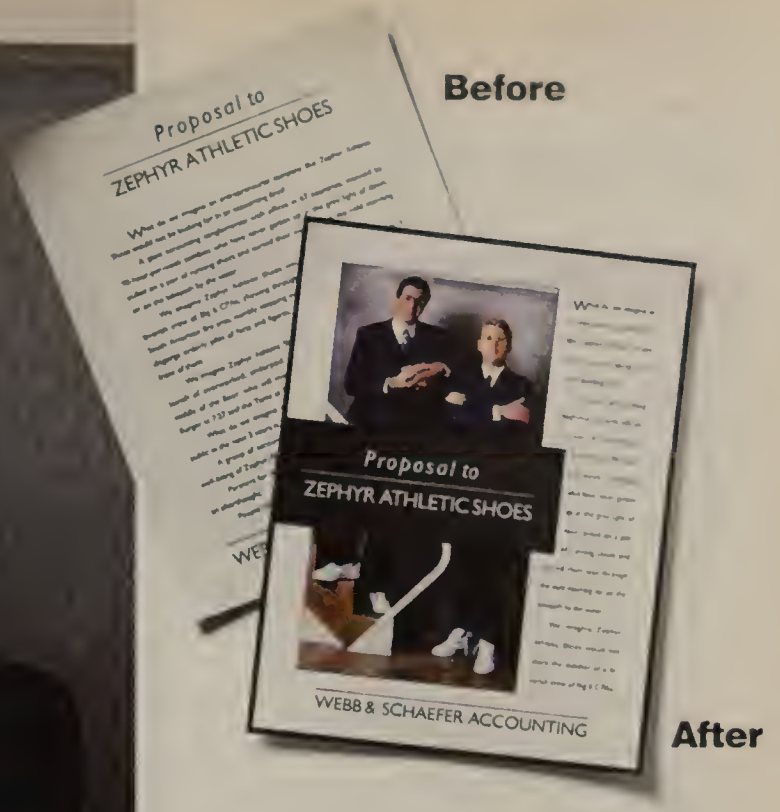
More important, SpeedScan doesn't seem to affect the ability of Virex 5.0 to seek out virus strains. I tried a couple of old virus-infected disks on it, and it caught every one. The only feature that appears to be missing is the ability to detect the presence of a virus in a compressed archive.

As new viruses are discovered, Datawatch will release new search strings and post them on various online services. But if you want to repair the new virus strains, you've got to subscribe to Datawatch's update service, at $75 per year. This entitles you to disks containing the new search and repair routines, plus any needed bug-fixes. When you buy the program, you receive one update for free.

In a product category where most of the software provides comparable protection, the new SpeedScan feature in Virex 5.0 puts it ahead of the pack. (At press time, Datawatch announced a 5.1 upgrade with network features.) Virex's extremely speedy, trouble-free performance makes the task of guarding against computer viruses almost painless.

—GENE STEINBERG





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After

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Arrange 1.1

Personal Information Database

PROS: Flexible viewing options and data structure; powerful search capabilities. **CONS:** Lacks some features found in dedicated PIM software; some functions relatively slow. **COMPANY:** Common Knowledge (415/325-9900). **LIST PRICE:** $349.

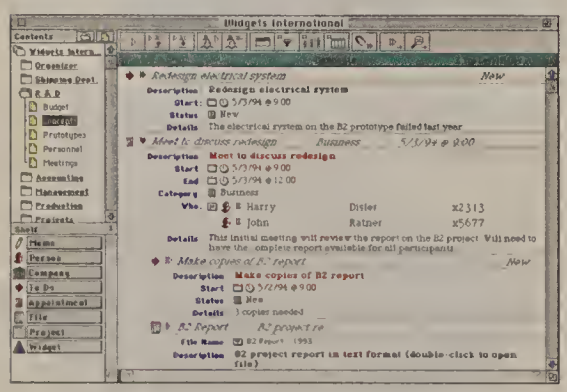
MW ★★★★

ALTHOUGH IT IS BILLED AS A PIM (personal information manager), it's easier to think of Arrange as a PIM construction set. Unlike PIMs that provide predefined templates for names, addresses, and other information, Arrange lets you organize data using an approach that combines the power of an outliner and the flexibility of a database manager.

In Arrange's hierarchical metaphor, the central units of data are called notes. The simplest notes store only unformatted text; more complex notes consist of up to 100 fields, including text, pictures, numbers, dates, and times. An unusual field called the Note Link holds copies of other notes—the copies are automatically linked, so any change in the original note is reflected in all of its clones. There are also four System fields that record when notes are created or modified, and by whom. Arrange ships with five note categories (memos, people, reminders, appointments, and to-dos), but you can define as many kinds as you need.

Topics, the next higher level in an Arrange document, are group-related items of information—for example, you might assign separate topics to store the personnel, inventory, and appointments for each department in a company. Topics, in turn, are organized into folders.

Arrange's main window is divided into three sections: the contents list at the top left displays the data file's structure, organized by folder. An area called the shelf, which is separated from the contents list by a movable divider, shows all the types of notes that have been defined for the current document. Clicking on a note icon in the shelf adds a blank note of that type to the current topic.



Data View Arrange displays topic notes in a familiar outline format. The tool bar at the top of the window provides quick access to most functions.

The largest portion of the window displays the selected topic's notes in an outline format. Like most outliners, Arrange lets you expand or collapse notes. Arrange also allows you to display topics in an abbreviated fashion, with each note represented by a single summary line that includes one or more fields.

Arrange lets you define views that present subsets of data. Arrange's view functions operate at the topic level; for example, the filter tool lets you display notes with fields that match certain criteria, and the sort tool sorts the data on up to four different fields. Arrange also includes a calendar view that displays notes in daily, weekly, or monthly format, and a table view that lists items in columns.

Moving data within Arrange is fast and intuitive. You can drag fields, notes, and topics from place to place, even between documents. In addition to a Find command that works like the search function of many word processors, Arrange includes a tool for gathering notes that match user-defined criteria and copying them to any specified location.

Arrange's merge feature lets you reconcile two copies of a document at the note level. Arrange lets you import data from other applications using an extension called the Grabber; when you select any text or graphic and press a predefined hot-key combination, Arrange automatically places the selection in a special topic in your default document. (If Arrange isn't running, the transfer occurs the next time you launch Arrange.)

Although Arrange can be used as a contact manager or scheduling program, it is less than ideal for this purpose. Arrange lacks the automatic text formatting and check boxes, for example, found in dedicated applications such as Aldus's TouchBase Pro and Portfolio Software's Dynodex, and Arrange doesn't support alarms or recurring events. It also is slow at some operations; in a head-to-head comparison, Arrange took 20 seconds to sort a list that Now Software's Now Contact handled in under 1 second (see *Reviews*, March 1994).

I like Arrange as a general-purpose information manager. Its flexible, intuitive approach to data handling makes it an excellent tool for storing all kinds of day-to-day information. With a speed boost and a few additional features, Arrange might even persuade me to throw away my contact manager and scheduler.

—FRANKLIN N. TESSLER

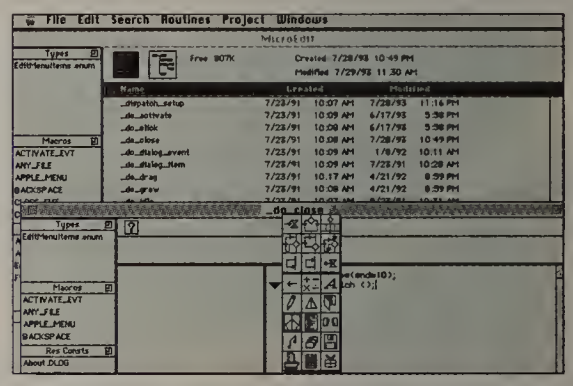
VIP-C 1.0.1

Programming-Code Generator

PROS: Generates code for either MPW or Think C compilers; text and diagram modes both useful. **CONS:** Import of existing projects requires cleanup. **COMPANY:** Mainstay (805/484-9400). **LIST PRICE:** $495.

MW ★★★★

LET'S SUPPOSE YOU'VE DECIDED TO try your hand at writing a Macintosh application. Recognizing that C is the main application-programming language these days, you bought a copy of Think C and have dutifully worked through the first volume of Dave Mark's *Macintosh Programming Primer* ($24.95; Addison-Wesley, 1989). Now the fun begins. You notice that a modest application has a



View from the Top VIP-C lets you inspect your code from a collapsed outline view or as a flowchart, and then browse individual routines. The icon palette is used to control program flow, but can be bypassed for an all-text programming approach.

compiled size of half a megabyte, you translate that figure back into an estimated number of lines of source code, and conclude that writing a page of debugged code per night should give you a finished app when your toddler graduates from high school. What to do?

Buy VIP-C (for visual interactive programming), that's what. It's not the answer to every programming problem, but it provides a way around the daunting task of developing a proper Mac interface for your application. There are some good tools for this, notably Bowers Development's AppMaker and the Macintosh Programmer's Workshop's venerable MacApp. VIP-C competes with these: it's a code generator, not a compiler, but it's easier for beginners to use, since it represents a natural extension of first steps in programming rather than being a complete world of its own.

The heart of the VIP-C system is the dispatcher framework (a set of routines

continues





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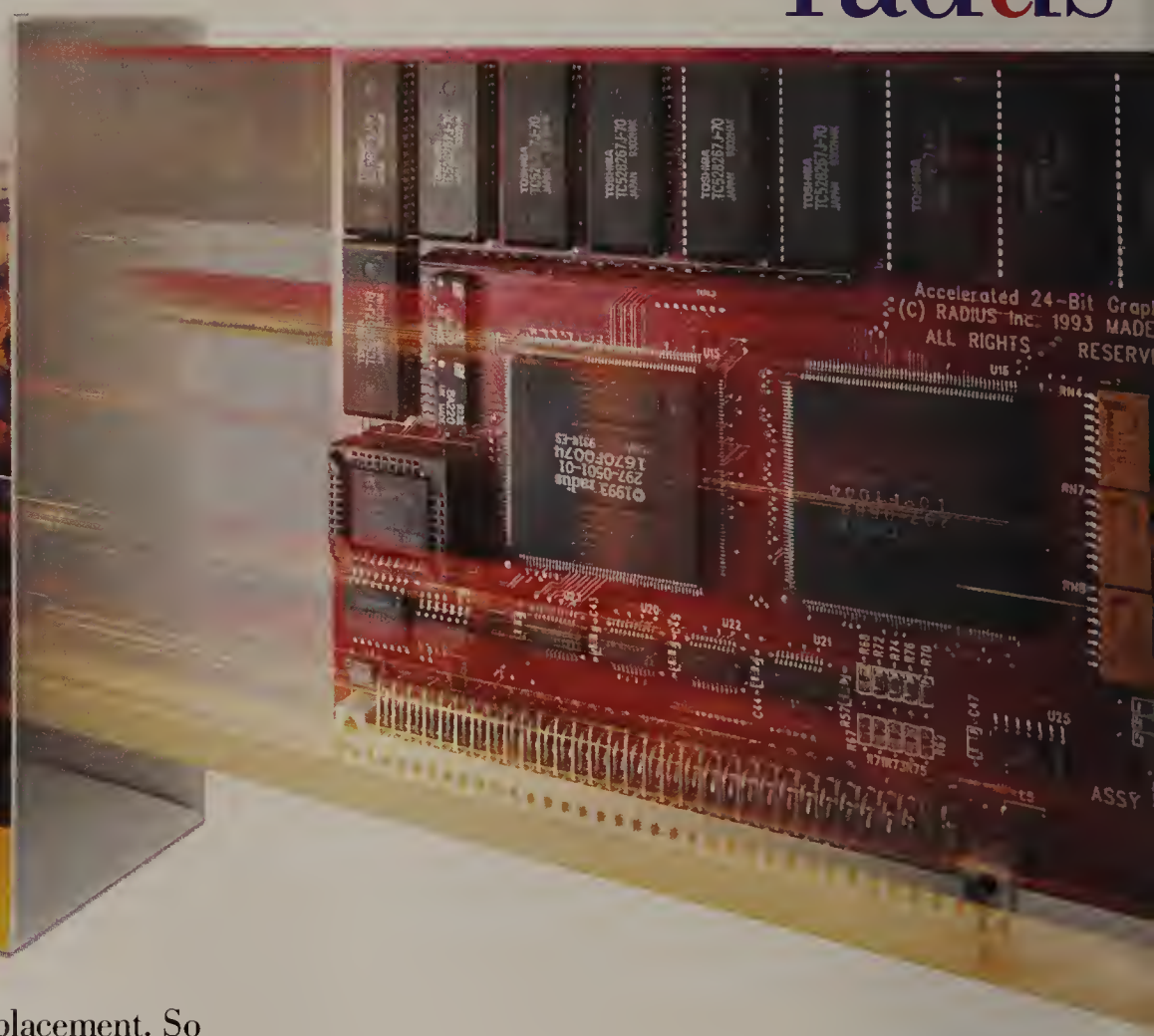
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Circle 14 on reader service card

that amount to a skeletal version of MacApp), which creates an event loop and monitors the set of possible Mac events. You add application code to this structure using browserlike windows that monitor source code, variables, constants, and macros (see "View from the Top"). You can either find routines and commands as text and cut and paste them into program source code, or use VIP-C's icon set to direct program flow. Because you deal with code blocks that often describe both data structures and operations on the structures, VIP-C resembles an object-oriented environment.

What makes VIP-C valuable is that Mainstay has actually done a good job of all this. It's not just that prototypes for Toolbox calls and function templates ensure that you avoid trivial mistakes, but also that Mainstay has included canned chunks of code for creating menus and dialog boxes, and the product has its own resource editors. Since the program has a built-in interpreter and a competent debugger, you can do lots of tinkering before sending your code to be compiled. VIP-C uses an Apple events link to MPW or Symantec compilers (it supports direct calls to Think Reference), or the code can be written out as a standard ANSI C file. You might want to write out the source-code file to add inline assembler calls, for example, or to perform special optimizations. You can distribute your VIP-C code with a royalty-free run-time module, although you probably wouldn't do this in a big-time commercial product.

VIP-C organizes your work in a project file like that in Symantec products, and you can import existing projects into VIP-C (after some editing on features not supported). The real strength of the VIP-C system, however, is not in taking over projects with 300,000 lines of existing code but in rapidly assembling smaller projects. A surprising number of VIP-C developers use it to produce externals for HyperCard or 4D, claiming that having template-based access to function libraries means they don't have to remember picky C-syntax details.

Mainstay has included a large assortment of useful examples—so useful, in fact, that you can do lots of work in "code by borrowing" mode—and the large shipping box is filled with well-written documentation (no blocks of Styrofoam, as sometimes happens). You can learn VIP-C in 20 minutes, and if you've mastered the rudiments of C, VIP-C will let you code about 10 times faster than you can using only an editor. If you understand that the programming resource in shortest supply is your own time, you'll want a copy of VIP-C.—CHARLES SEITER

Two Duo Docks

Docking Stations

EtherDock

PROS: Provides full set of standard ports; directly supports Ethernet connection; supports VGA and SVGA as well as Mac-compatible monitors. **CONS:** Wobbly connection; quirky display software. **COMPANY:** E-Machines (408/541-6100). **LIST PRICE:** $699.

MW ★★★

SCSI MicroDock

PROS: Compact; inexpensive; supports both SCSI Disk mode and normal SCSI connections with a single cable. **CONS:** Wobbly connection; provides only SCSI and ADB ports. **COMPANY:** Newer Technology (316/685-4904). **LIST PRICE:** $175.

MW ★★★

AS ITS NAME SUGGESTS, THE MicroDock is one of the tiniest docking options available for the PowerBook Duo; it's just under 4½ ounces and barely 5 inches long. Adding the MicroDock to the Duo, you gain only two additional ports—but they are significant.

First, you get an ADB port, so you can attach a keyboard and/or a mouse. Second, and more significant, you get a SCSI port so you can attach SCSI devices (scanners, hard drives, and so on) to the Duo. Or you can use the Duo in SCSI Disk mode, where the Duo acts as an external hard drive for another Mac.

With a single SCSI cable, the MicroDock allows you to connect SCSI devices to the PowerBook, and to use the Duo in SCSI Disk mode.

The MicroDock snaps easily onto the Duo's 152-pin docking connector—though the connection feels wobbly, it's fairly secure. Unlike some docking devices, the MicroDock doesn't cover the entire back panel of the Duo, just the connector port itself, so you can still use the Duo's own modem/printer port and power-adapter jack to plug in the power supply and attach other peripherals.

Admittedly, for $175 the MicroDock doesn't add much in the way of connectivity to your Duo. You don't get video, sound, or floppy drive ports. But you do save money—and hassle—with the dual-purpose SCSI connection.

E-Machines' EtherDock is a heavier-duty docking option equipped with a full set of 11 ports—including an Ethernet port for connecting your Duo directly to an EtherTalk network that uses 10BaseT twisted-pair wiring.

The EtherDock looks and feels like Apple's Macintosh Duo MiniDock: it's the same size and weight, and attaches the same way. As with the MicroDock, the EtherDock's locking mechanism is alarmingly wobbly—but reliable enough to ensure a good connection.

Like the Apple MiniDock, the EtherDock is equipped with sound-in, sound-out, SCSI, printer, modem, video, floppy-drive, and power-adapter ports. There's also a security connector that you can use with an optional locking cable.

The EtherDock can output 8-bit color on monitors up to 16 inches and 4-bit color on monitors up to 19 inches. (The Duo MiniDock does not support monitors larger than 16 inches.) You can attach the EtherDock to VGA and SVGA monitors, but you need a $19 adapter cable. The dock also supports television monitors that support RGB video input.

EtherDock software comes with two control panels. The MirrorMatic control panel lets you set the external monitor to serve as a second display for the Duo, or you can activate display mirroring so that the monitor mirrors the output on the PowerBook Duo's internal display.

You can easily adjust the monitor's brightness and contrast using slider bars. I had less success with the other options—screen zooming, panning, and window centering were erratic and sometimes crashed the Duo. But the EtherDock connection works fine without these options.

If you don't need Ethernet, there are less expensive alternatives. Apple's MiniDock costs less and provides almost the same capabilities as EtherTalk. And if video output isn't a concern, the MicroDock is a logical, low-cost way to enhance your Duo.—JOSEPH SCHORR



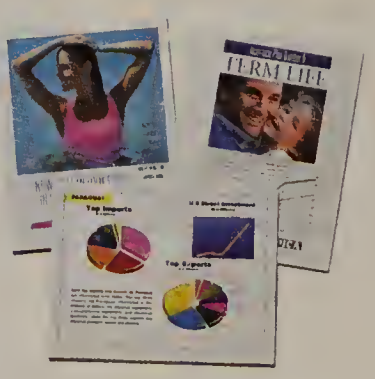
RICHARD REINHEMEYER

EtherDock (left), SCSI MicroDock (right)



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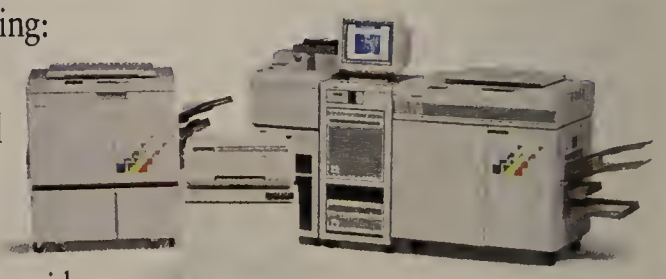
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Canon

SEE US AT COMDEX BOOTH #1456

Random House Unabridged Dictionary

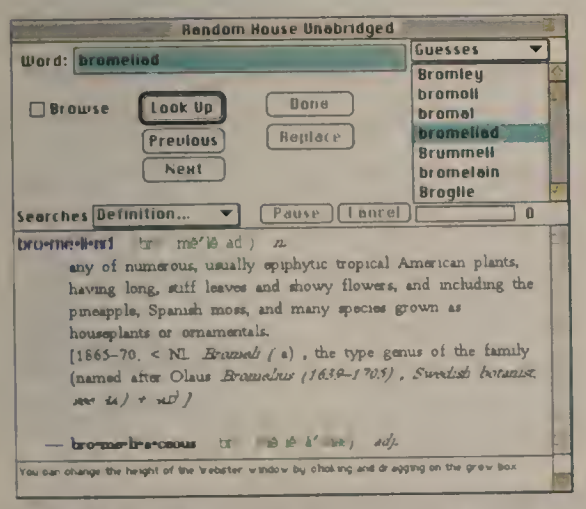
CD-ROM Reference

PROS: Most comprehensive American-made dictionary on CD-ROM; works within any program; good at guessing misspelled words; clean, simple design. **CONS:** Modest search capabilities; cannot print definitions; some functions don't work reliably; no manual; occasionally crashes. **COMPANY:** Random House Electronic Publishing (212/572-2600). **LIST PRICE:** $179.

MW ★★★

ALTHOUGH NOT NEARLY AS EXHAUSTIVE as the Oxford English Dictionary (OED), the Random House Unabridged Dictionary, CD-ROM Version (RHUD), is its primary competitor on CD-ROM and the most comprehensive American-made dictionary currently available for the Macintosh. Unlike OED, RHUD is a desk accessory that adds its own menu and a quick look-up function to all running applications. You need only highlight a word and invoke a command to look up the selected word. RHUD knows to convert the plural to the singular and a conjugated verb to an infinitive before searching. If the word is misspelled, it offers a list of possibilities. Unlike OED, RHUD easily handles most transposed, missing, and extra letters, even when they occur at the beginning of a word. Should you wish to replace the word in your document with the correct spelling or a more appropriate word, RHUD can do that, too.

Graced with a lean design—a single window with one text-entry box, one list box, and one definition-display box—RHUD is considerably easier to use than OED. Triple-clicking on any word in the current definition puts its definition in the display box. With the Previous and Next buttons, you can flip through neighboring definitions one-by-one. (Unlike OED, RHUD cannot display a continuous alphabetical list of headwords that you can browse through.) As you look up words, RHUD maintains a list of the definitions it has displayed; selecting any word in this history list quickly returns you to a previous definition. A pop-up menu lets you switch among the history list, spelling-guess list, and other lists that appear in the list box.



Our Best Guess If you don't know quite how to spell a word (or you simply mistype it), the Random House Unabridged Dictionary helps out with a scrolling list of guesses (upper right).

In addition to standard word lookup, RHUD can conduct only three types of searches. (As with OED, some searches take a long time.) Anagram searches look for all valid words that can be formed from a set of letters. Wild-card searches look for valid words that match the entered wild-card letter combination. Definition searches look through all the definitions (but not etymologies or other parts of an entry, as in OED) for the given word or phrase. AND, OR, NOT, and parenthetical operators make it easy to refine a definition search.

Not everything works smoothly, however. Pause and Cancel buttons only erratically pause and cancel searches. Attempting to display the definition of a word appearing in a definition search list often causes the program to quit instead. There are two kinds of on-screen help, neither very satisfactory, and there is no manual. (Unlike for OED, however, tech support is available.) You cannot print definitions; you can copy a definition to your word processor, but as with OED, you lose all formatting. (RHUD's formatting is easier to reconstruct than that in OED.) The options that suppress display of the etymology and pronunciation in definitions do not work. The electronic edition also lacks many of the supplements found in the printed edition.

While RHUD's search options are much more modest, the quality, design, and reliability of the software are far superior to OED's. True, compared with OED, RHUD's entries tend to be quite concise with brief etymologies and few quotations. But unless you really need the kind of comprehensiveness OED offers (at $895), I recommend that you save a bundle and buy the Random House Unabridged.—ROBERT C. ECKHARDT

Wacom UD-1212R

Graphics Tablet

PROS: Easy to use; highly customizable; supports input from two devices simultaneously. **CONS:** Incompatible with AppleTalk and AppleTalk Remote. **COMPANY:** Wacom Technology Corporation (206/750-8882). **LIST PRICE:** $749.

MW ★★★

MICE AND TRACKBALLS ARE FINE up to a point, but they're clumsy tools for creating artwork. Using a mouse is akin to drawing with a brick, and using a trackball is like drawing with a marble. Pressure-sensitive systems close the gap between computer and pen or brush.

Like most digitizing tablets, the UD-1212R substitutes a pressure-sensitive stylus and graphics tablet for a mouse or trackball. But in addition to the cordless stylus, it comes with a four-button cordless puck with a set of crosshairs imbedded in a transparent window in front. But the UD-1212R is much more than a mouse replacement.


TOM GIBSON

Wacom UD-1212R

A single well-designed control panel allows you to set preferences for pressure, macros, and serial port, along with an astonishing number of performance parameters for tablet, puck, and stylus. You can also save custom settings files for individual applications as well as the Finder. Comprehensive, illustrated online help is available via the Wacom control panel.

The tablet itself measures about 16 inches square with a 12-by-12-inch active area. It connects to the Mac via either the modem or the printer serial port; an AC adapter attached to the serial cable plugs into an electrical outlet. Giving up a serial port can cause you some headaches, since you can't then connect simultaneously to a printer and modem. For about

continues

New Delrina Fax PRO for Macintosh is the best fax software you can buy. Details below.



Their details.

Actual fax output typical of a fax machine or other fax software.

Our details.

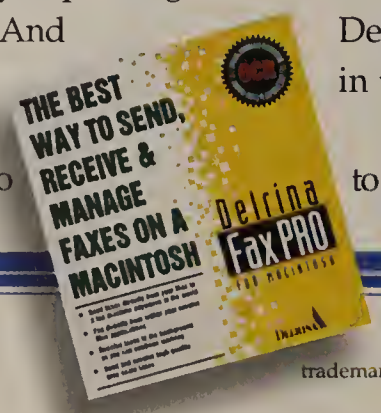
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Tired of fax machines and fax software sending images like the one on the left?

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Plus, Delrina Fax supports all fax modems, even the PowerBook Express Modem and the AV GeoPort Telecom Adapter. And unlike other fax software, you gain the reliability provided by Delrina's Communications Toolbox fax drivers. So as you update your system software or hardware, Delrina Fax keeps on working. And it's made by Delrina, the makers of the best-selling fax software in the world, WinFax PRO™.



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Circle 137 on reader service card

$55 you can buy a mechanical A/B switch that will let you switch between two of these devices. Although the UD-1212R is compatible with many telecommunications programs, it is not compatible with Apple Talk or AppleTalk Remote.

A transparent overlay on the tablet facilitates tracing reference drawings. You can use the entire active tablet area or set up to six smaller custom active-area maps for comfort and speed. Cursor speed is determined by the ratio of the active area to the display area.

You can program F-keys at the top of the tablet to play any macros, independent of any keyboard F-keys; and memory buttons let you select from three preset and two custom tablet-command sets.

The stylus is a seemingly simple device, but both the switch on its barrel and the pressure-sensitive tip can be programmed in 13 ways—for example, to click, double-click, click-lock, shift, and so on. These settings make the stylus useful even in programs that aren't graphics oriented. The buttons on the puck can be assigned any of 12 functions. The puck is slightly smaller than an average mouse. In fact, it's so small and light that I found it somewhat difficult to hold steady. The UD-1212R is the only digitizing tablet to accept input from two devices simultaneously—letting you use the stylus to make menu selections while leaving the puck stationary during tracing, for example. For now, this advantage is theoretical for Macintosh users. The only program that supports two-cursor input is AutoCAD for DOS machines.

It used to be easy to spot computer-generated art by its razor-crisp lines. What was missing was expressive line quality. Pressure sensitivity solved that problem. The UD-1212R lets you customize pressure sensitivity and save those settings along with other application-specific settings. Depending on the application, you can further adjust the effects of pressure on various tool attributes such as line width and paint opacity. In Adobe Illustrator, for example, pressure can vary the line width of the brush tool, giving you an effect something like an ink-soaked brush on dry paper. Fractal Design Painter and Adobe Photoshop use pressure sensitivity to emulate brushing or spraying paint. And the ability to adjust paint opacity as you retouch images is a tremendous asset.

With all these custom options, you might think mastering it would be difficult. Fear not—the UD-1212R is intuitive enough to be used successfully right out of the box, even by entrenched mousers. You may wonder how you ever got along without it.—MATTHEW NIELSEN

Brother HJ-400

Ink-Jet Printer

PROS: Works with Mac and Intel-based computers; two-year warranty. **CONS:** Slow; no background printing; some large files require additional application memory to print correctly. **COMPANY:** Brother International (908/356-8880). **LIST PRICE:** $369.

MW ★★

THE BROTHER HJ-400 IS A COMPACT, 360-dpi ink-jet printer with a tray that holds 100 pages of letter-size paper, and a sheet-feeding vertical paper tray at the back that doubles as a receptacle for up to 20 printed pages. A large manual-feed slot lets you insert pages or envelopes by hand, although the lack of adjustable paper guides makes center loading a bit tricky. Buttons and status lights at the front let you control and monitor the printer's operation. Ink cartridges are rated for 700,000 characters in high-quality mode.

The HJ-400 connects to either of the Mac's serial ports using a standard RS-422 cable that must be purchased separately. You can also use the printer with IBM and compatible computers. (According to the manual, the HJ-400 switches between the two interfaces automatically, although I did not test this.) Brother's AC adapter is praiseworthy because its normal-size plug doesn't waste valuable space on an AC power strip.

The HJ-400 provides three settings for quality (best, normal, and faster) and two for print density (normal and economy). In my tests, the type of paper I used markedly affected output quality. For example, text and graphics that looked sharp on 24-pound bond paper appeared fuzzy on 20-pound copier stock, even at the best-quality setting. Still, the HJ-400 produced readable text at sizes down to 6-point. The printer ships with six TrueType fonts and works with Adobe Type 1 fonts if you have Adobe Type Manager installed. For rapid proofing, the HJ-400 prints with its own resident fonts.

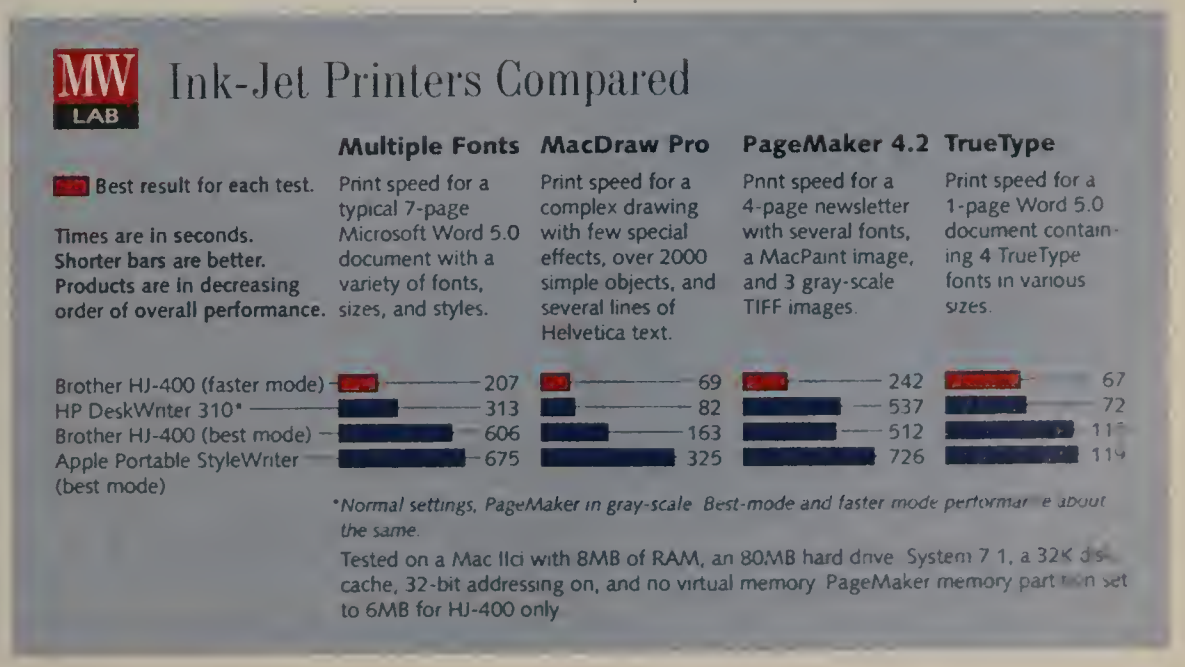
Like most ink-jet printers, the Brother HJ-400 is not speedy. It took just under one minute to output one page of double-space text at normal quality, and best-quality printing took almost twice as long. Speed would be a lesser issue if the HJ-400 supported background printing, but it does not. Also, desktop publishers should know that some large files, such as multipage Aldus PageMaker documents, do not print correctly unless you allocate additional RAM to the application—a caveat not noted in the HJ-400's manual.



RICHARD RETHEMEYER

Brother HJ-400 printer

With prices for laser printers dropping, ink-jet printers are no longer the only option for bargain seekers. Even so, the most inexpensive lasers still sell for several hundred dollars more than the HJ-400. If you're in the market for an ink-jet printer, I'd recommend the Hewlett-Packard DeskWriter 310 over the HJ-400. It has greater portability, a smaller footprint, and optional color printing, for only about $100 more than the HJ-400.
—FRANKLIN N. TESSLER



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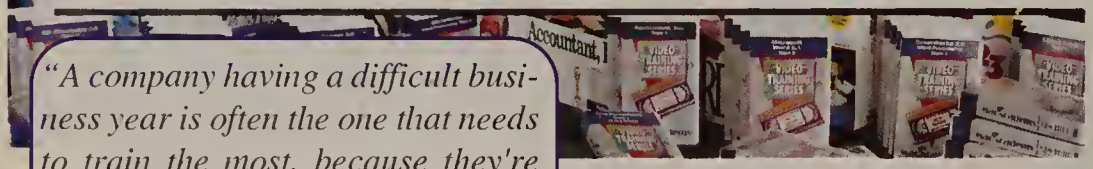


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CD-ROM ToolKit 1.0.5

CD-ROM Accelerator

PROS: Speeds access to CD-ROM files; supports a wide variety of formats and CD-ROM drives; easy to customize. **CONS:** Playback of accelerated QuickTime movies is often uneven; games occasionally crash when played in accelerated mode; caching requires 1MB to 3MB contiguous hard drive space. **COMPANY:** FWB (415/474-8055). **LIST PRICE:** $79.

MW ★★★★

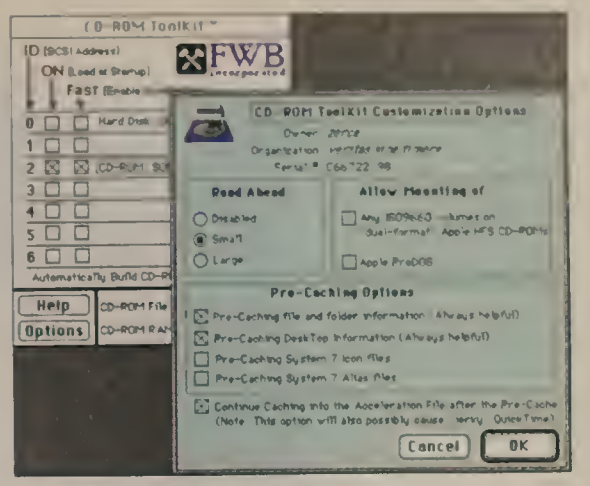
IF YOU'RE TIRED OF WAITING FOR CD-ROM files to creep across your SCSI cable, you might consider taking up a new hobby such as knitting alpaca monitor covers or carving scale models of all the bones in the human body from bars of soap. Or you can install FWB's CD-ROM ToolKit.

Based on a SCSI device driver that supports a wide spectrum of CD-ROM drives, CD-ROM ToolKit can halve the time it takes to open files and search on a CD-ROM. Working in the background, CD-ROM ToolKit's driver-based caching utility speeds data transfer by storing file- and folder-directory information on your hard drive and by read-ahead caching (anticipating the next request for data and fetching it to memory, an operation sometimes called prefetching).

CD-ROM ToolKit's control panel lets you choose the size of both the RAM cache and the hard drive cache. The default RAM cache is 232K, but you can set it as high as 3MB. The default for file caching on a hard drive is 3MB; the maximum—4MB—increases speed slightly. The amount of space allotted to the file cache must be contiguous—no fragmentation allowed. Predictably, double-speed drives achieve lower speed gains than single-speed drives.

Compatibility is a real plus for CD-ROM ToolKit. Besides supporting Macintosh HFS, Kodak Photo CD, ISO 9660, High Sierra, and Apple ProDOS formats, the program is compatible with most CD-ROM players, including Sony, Toshiba, Chinon, Pioneer, NEC, and Philips. CD-ROM ToolKit supports most double-speed and multisession drives and allows many drives that couldn't previously recognize Kodak's Photo CD format to read single-session files.

QuickTime movies are the main bugaboo in CD-ROM ToolKit. Syncing sound and video in any CD-ROM environment is tricky; adding acceleration invites more trouble (see "Opting for Acceleration"). You may have to turn off acceleration altogether with some QuickTime files.



Opting for Acceleration CD-ROM ToolKit allows users to fine-tune caching options to best suit their needs and system constraints. When working with QuickTime files, choose Read Ahead Small and turn off the Continue Caching option. When opening large files such as Kodak Photo CD files, the Read Ahead Large option prefetches 32K of data at a time.

For audio CDs, CD-ROM ToolKit includes the nifty CDT Remote. Besides the usual options, this DA includes niceties such as fast-forward and shuffle play.

CD-ROM ToolKit's acceleration requires at least a Mac Plus with System 6.0.4, 1MB of RAM, 1MB to 3MB of contiguous space on a hard drive, and, of course, a CD-ROM player.—SUZANNE STEFANAC

Atticus Vista 1.0

Disk-Cataloging Utility

PROS: Quickly and automatically catalogs floppy and removable disks; quickly formats and prints disk labels in Avery label formats. **CONS:** Flawed disk-request feature; no label sorting; limited search options. **COMPANY:** Atticus Software Corporation (203/348-6100). **LIST PRICE:** $69.95.

MW ★★★

OK, I ADMIT IT. MY FLOPPIES AND other removable disks are in a disorganized mess. Atticus Vista was designed for folks like me. It consists of a control panel and application that automatically catalog the disks you mount on the Mac's desktop.

Each time it scans a drive, Vista puts up a small dialog box asking if you want to create a snapshot of the disk's directory. You can also have the program skip the request and simply display a warning hand when saving the directory, or display nothing.

Vista loads the disk information and stores it in a directory called a Vista. Each Vista directory has a full catalog of all the disks the program has scanned, and it displays an icon for each disk. When you click on an icon, you see that disk's directory, including program and document icons. If the contents of the disk have changed, because you've added or removed files, Vista automatically updates the entry when the disk is mounted.

Vista has additional capabilities. One feature allows you to easily capture the directories of multiple disks. Each disk ejects automatically to quickly make room for the next. A File Walkers option searches the contents of compressed archives created in Compact Pro or StuffIt. You can also collect directory snapshots in a single window, search their contents, and print them using the Label Monitor feature. The directories are automatically formatted for use with several types of Avery labels, and you can print either a single directory or the entire list.

When you double-click on a file name inside the Vista, the listing acts like an alias, and you get a message telling you to mount the disk. At least that's the theory; in practice, I found that it doesn't always work. Sometimes Vista would tell me that I wasn't using a proper alias, or it would launch the application that created the document without requesting the disk that the document was stored on. (Atticus's technical support is aware of these problems.)

Vista has a few other problems. For example, you can't view a disk directory from the application. Instead, you must go to the Vista and double-click on the disk icon. The only way to open a directory from inside the application is to add the directory to the Label Monitor directory. But if a directory contains more names than a label can hold, Vista lops off the end of the list, and the search feature can't find those names. Disks are displayed in the Label Monitor directory only in the order the directories were read; they can't be sorted.



Labeling Your Disks Atticus Vista's Label Monitor lets you search your disk catalogs and print labels in several Avery label formats.

With a few more bells and whistles, and a fix for the alias problem, Atticus Vista could be the last word in managing disk collections. As it is, the program is reasonably well behaved in normal use and can help bring order to even the most disorganized disk collection.—GENE STEINBERG



One of these is a color proof and one is output from our new printer. We forgot which is which.

We paid $70 and waited three days for one of these. The other popped out of our new Tektronix Phaser™ 480 in minutes. Pull out your loupe and start guessing. And while you're down there staring, note our output's phenomenal color. PANTONE®-approved, it's perfect for matching those tricky product colors, logos and skin tones. You might also notice the full 11" x 17" print area. Yes, Virginia, there are tabloid-sized full bleeds. And it shares easily: the Phaser 480 is a work group printer for Macs, PCs or workstations. Plus, it boasts a powerful RISC processor and true Adobe® PostScript™ Level 2. Spread-sized bleeds? Reprint quality comps? Pre-film proofing right at your desk? Welcome to preproduction heaven.

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Cypress PhonePro 1.2

Telephony Software

PROS: Can easily develop customer-support, order-taking, and literature-distribution functions; particularly simple voice-mail-system construction. **CONS:** Needs icon-to-text conversion for larger scripts. **COMPANY:** Cypress Research Corporation (408/752-2700). **LIST PRICE:** $349; software and modem $950.

MW ★★★★

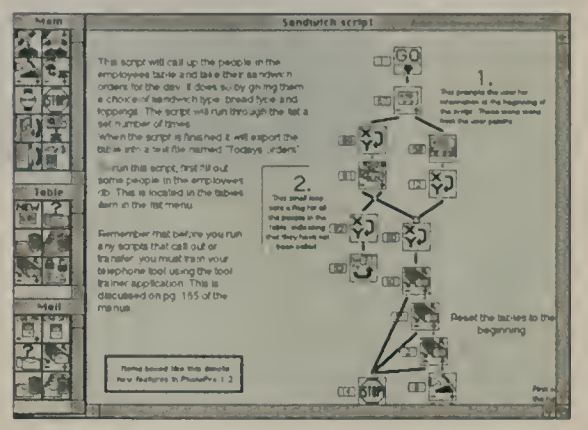
THE MAIN STRENGTH OF CYPRESS PhonePro is its easy-to-learn icon-based script-programming system. PhonePro has three classes of icons: mail (which includes log on/off, send/receive, and icons for navigating stored messages); database (for text records and stored sounds, words, and phrases); and main (telephonic logic and branching operations). Once you know the meaning of the 40-odd icons, you can put together simple scripts in minutes. To turn your Mac into a digital answering machine, for example, you would have a simple chain of six icons (Go, Pick Up Phone, Play Outgoing Message, Record Incoming Message, Hang Up, Return To Go). By putting branches in this simple script (on touch-tone 3 play message 21, and so forth), you could expand the basic script to manage a full voice-mail system.

For complex scripts, however, this visual script representation becomes confusing; a separate editing window in which the icons would be converted to equivalent text commands would speed development of larger projects.

Version 1.2 of PhonePro brings support for Apple System enhancements and simultaneous use with Cypress Research's FaxPro II ($550 for the software-only version). The Apple Open Collaboration Environment, featuring PowerTalk and PowerShare for System 7 Pro users, extends the scope of PhonePro. A Mac connected by modem to a single outside phone line and a network can distribute PhonePro voice-mail messages to the desktop mailboxes of individual PowerTalk clients. Support for Apple events and AppleScript allows companywide installations of PhonePro-using Macs to call each other and update PhonePro scripts and databases. With FaxPro II support (you can use both Cypress products on a single Macintosh if you use the phone port for one and the printer port for the other), the response can now be a fax rather than a callback or simple voice message. Cypress Research sells a complex script called FaxMessenger ($49.95) to automate this situation.

Both PhonePro and FaxPro II are available in software-only versions, which are designed to work with Supra Corporation's SupraFaxModem V.32 and V.32bis fax modems. PhonePro 1.2, simply by better integration with Apple's advanced operation features and with other Cypress products, has greatly extended the business scope of this already powerful product.

—CHARLES SEITER



Order Up! This whimsical example in PhonePro 1.2 shows an automated lunch-ordering system, in which a company's phone system itself polls employees at predetermined times for sandwich orders, and then calls in the orders to a catering service. In PhonePro 1.2, FaxPro capabilities can be integrated to send out the order as a fax.

EtherWave

Ethernet Transceiver

PROS: Low cost; extends hub investment; transportable and modular. **CONS:** Minor IS-management issues. **COMPANY:** Farallon Computing (510/814-5000). **LIST PRICE:** $129.

MW ★★★★★

MW LAB REMEMBER BACK IN 1984 WHEN you discovered how easy it was to connect two or more Macs directly? That was the Mac's first implementation—AppleTalk over a LocalTalk connection—of easy-to-use, no-fuss networking. Then remember pulling your hair out waiting for a 1MB to 2MB file to transfer between those Macs? Well, it's 1994 now, and Farallon's new EtherWave transceiver enables users to have this connectivity magic in the speedy, 10BaseT Ethernet world.

The EtherWave transceiver functions much like any other 10BaseT transceiver. It attaches to the Mac's internal Ethernet port and connects to your network hub via whatever wiring scheme you have installed in your office. The principal difference between the EtherWave and standard transceivers is that, instead of providing one 10BaseT twisted-pair jack, the EtherWave includes an additional jack that allows you to daisy-chain to another Mac, PC, or printer through an additional 10BaseT line. Status lights on the transceiver indicate traffic information as well as collision and jabber occurrences.

The EtherWave can be used to create a small, isolated workgroup or to daisy-chain more than one device from a single hub or star port (more commonly reserved for a single device). The rule is that you can have no more than eight devices daisy-chained by an EtherWave in an isolated network, and no more than seven devices can be attached to a hub port or router. The physical distance from end to end is limited to 100 meters.

Macworld Lab tested the EtherWave transceiver by setting up a network using an Ethernet hub. From one port we connected seven Centris 650s using an EtherWave. On another port we connected a Centris 650 running a packet generator to create network traffic. Finally, we attached a Mac IIci to yet another port on the hub as a target server to receive the data, and measured the time it took to send a 1024K file from the last Macintosh on the EtherWave chain to the target Mac IIci. For comparison, we then attached all nine Macs directly to the hub, using nine ports rather than three, and performed the same operation. Both tests yielded similar results, transferring the file across the network in about nine seconds.

Our tests demonstrate the convenience to administrators of both small and large networks of adding nodes to an Ethernet network without the hassle and added cost of pulling wiring from a wiring closet or adding additional hubs. In addition, our test results show that performance is not an issue.

The only real drawback to using an EtherWave is that some Ethernet hubs can track only a single node address per hub port. A hub is normally meant to work with only one device attached to each port. Adding devices to a port can cause problems if the hub-management firmware or software is meant to track only a single network address, rather than the multiple addresses created using an EtherWave. (Farallon claims that hub vendors are working on changing this limitation.)

With a higher street price, the EtherWave costs more than standard Ethernet transceivers such as Asanté Technologies' FriendlyNet and Dayna Communications' DaynaPort TRX-T. But the added cost is minor compared with the cost of pulling wire or purchasing additional hubs.

If you need to expand your network at a reasonable price with minimal fuss, get an EtherWave.—MATT CLARK

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4D First 1.0

Entry-Level Relational Database

PROS: Plenty of relational functionality; compatible with existing 4D applications; works with 4D Server. **CONS:** Not much easier than real 4D; inadequate documentation and help.
COMPANY: ACI US (408/252-4444). **LIST PRICE:** $295.

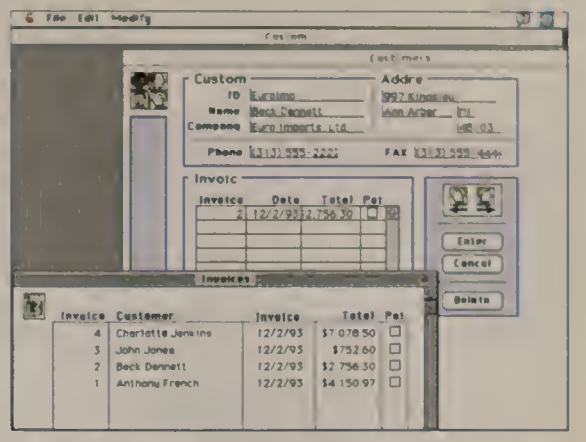
MW ★★★

SEVERAL YEARS AGO ACI US INTRODUCED File Force, which was intended to lure the users of flat-file databases (Claris's FileMaker, ProVue Development's Panorama) into the relational world. 4D First is a second attempt at an entry-level product, and although it's an improvement on File Force, it's easier than the actual 4th Dimension only in the sense that it's easier to cover the first 15 chapters of a textbook than the whole book. You can do interesting applications in 4D First, but you are unlikely to be doing them in your first week.

4D First is good news, however, for companies with a significant 4D investment, and also for developers. 4D First can be used as a replacement for 4D in a client-server setting using 4D Server. 4D First can open and modify applications created in 4D, and vice versa. Developers can use it as a run-time module replacing 4D's run-time version, with the extra benefit that users can make simple modifications of database models themselves, if necessary. Essentially, 4D First is 4D with most of the programming capabilities removed.

For first-time database users, that is both 4D First's strength and its weakness. You can easily set up database files, draw relations (one-to-one, one-to-many—in fact, all valid types) between files using easy graphics tools, and design report or data entry layouts using relatively straightforward tool palettes. 4D First supports various types of compression for image files. If you are familiar with 4D, or for that matter such now-defunct products as Borland Reflex or Ashton-Tate's dBase Mac, the tools and methods will be just what you expected—the only difference is that 4D First is less expensive.

The weakness is that ACI US's main concession to beginners is simply to leave out some advanced elements of 4D. The tiny (4-by-7-inch) manuals offer a subset of the usual 4D manuals—there's no equivalent of a *4D for Dummies* pamphlet. There are no specifics on troubleshooting. There's no online help; the only reference to Help in the manuals tells you how to add balloon help to your own applications. The Quick-



Sample Layout 4D First provides all the ingredients you need to bake up your own business database applications. The infelicities in this and other sample layouts, and the absence of online help, suggest a bit of haste in this release.

Report feature is easy to use, but it doesn't offer Print Preview. The samples and tutorial files don't provide enough canned solutions for common business situations (some of them seem to have been quickly put together and don't display properly).

If you're already part of the 4D universe, you will welcome 4D First. It's a low-cost way to distribute the power of real 4D and 4D Server to an office full of Macs. If you're a FileMaker Pro user looking to step up from a flat-file database to a relational database, 4D First is a reasonable place to start, but it won't do your database homework for you.—CHARLES SEITER

MacWrite Pro 1.5

Word Processor

PROS: Can automatically generate table of contents; supports QuickTime, PowerTalk, EGO objects, AppleScript. **CONS:** Table-of-contents and AppleScript functions are limited.
COMPANY: Claris Corporation (408/727-8227).
LIST PRICE: $249.

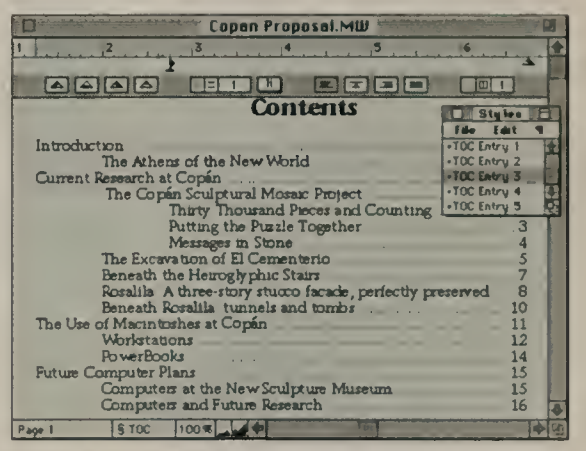
MW ★★★★

WITH MACWRITE PRO 1.0, CLARIS beefed up its classic, low-end word processor with style sheets, text wrap around graphics, variable-width columns, independently formattable sections, and other advanced features, without sacrificing MacWrite's uncluttered interface. MacWrite Pro 1.5 has also added a handful of new features, the most significant of which is a table-of-contents function. You use styles to designate headings and subheadings up to five levels deep. You can specify format details for entries, such as whether the page number should appear to the right or the left of the entry. Finally, a command compiles the list of headings, creates a new section at the beginning of the document (or locates whichever section you specify for contents), and places the contents list there. Entries in the table of contents are fully editable and easy to format.

Other enhancements include the ability to insert QuickTime movies in a document. Like graphics, movies appear in frames that you can move, add borders to, and wrap text around. You can crop movies, scale them, or hide them to speed up scrolling; on paper, MacWrite prints the currently displayed movie image.

If you use PowerTalk (part of System 7 Pro), you can add a mailer to any MacWrite document and E-mail it (in MacWrite or one of about a dozen other formats) or reply to or forward MacWrite Pro documents that you've received. If you are using a program that supports EGO (Edit Graphic Object) objects—only MathType (from Design Science) and microExpressionist (from Prescience) do so far—MacWrite's Edit command automatically launches the program that created the graphic and, when you are finished editing, updates the graphic back in MacWrite.

Finally, many MacWrite functions can be automated with AppleScript (another part of System 7 Pro). You can use available AppleScript commands to create scripts that apply styles; search and replace; run mail merge; and insert text, graphics, or movies. More-complex operations, such as adding headers and footers or working with tables,



Stylish Contents You use character styles to designate headings and subheadings in a document as contents entries. MacWrite Pro reformats each entry with a corresponding table-of-contents paragraph style of the same level.

are not supported, and there's no create-by-example watch-me mode. Also, only AppleScript commands are defined in the MacWrite OSA (Open Scripting Architecture) Dictionary.

Overall, MacWrite Pro has kept its clean, uncluttered interface, not to mention its other positive attributes (see *Reviews*, *Macworld*, July 1993). Although still not as powerful as Microsoft Word (which does not support AppleScript, but can generate up to 18 different contents lists) or WordPerfect, MacWrite Pro remains an excellent choice for a low- to middle-level word processor.—ROBERT C. ECKHARDT

BaseMap 1.0.1

Mapmaking Program

PROS: Relatively easy to use. **CONS:** Provides only one projection; poor program design; maps lack detail; very limited data-display abilities; cannot add text or fill areas. **COMPANY:** GeoPoint (415/957-1560). **LIST PRICE:** $149.

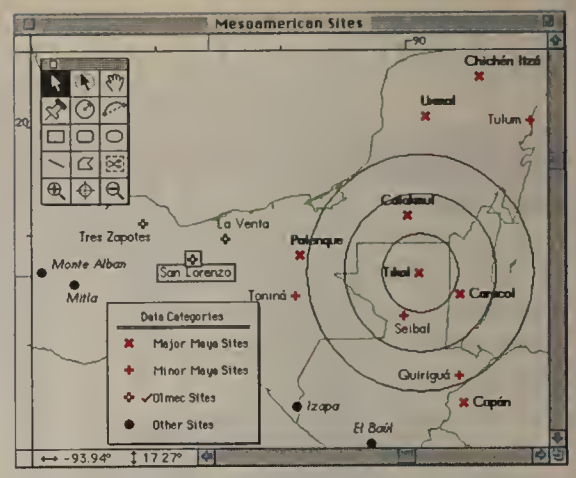
MW ★★

BASEMAP MAKES OUTLINE MAPS OF almost anywhere on earth except the poles, using a simple cylindrical projection. You begin by cutting out a piece of the program's main world map (which shows coastlines only); however, the cropping tool is awkward and doesn't let you adjust crop marks before cutting. Included geographic databases make it easy to add international and U.S. state boundaries, plus labeled data points for world capitals, U.S. state capitals, major U.S. cities, and major U.S. airports. You can import other cities, river courses, and political boundaries from geographic databases GeoPoint intends to release soon, or from databases you create in BaseMap. You can also manually place and label custom data points anywhere on the map.

The only information BaseMap can express is the division of data points into user-defined categories—types of archaeological sites, for example. Inconveniently, you must manually click on points and assign their categories; you can't put this information in the database and have BaseMap label the points automatically. Further, category symbols are limited to 30 not very appropriate Zapf Dingbats. The font and format of any label is your choice (you can also hide the labels for all points), but, again inconveniently, you can't link a label format to a category.

The program can add longitude and latitude lines at user-defined intervals, but the coordinates do not print. Similarly, a tool draws a great-circle route between any two points and calculates the distance as you draw, but you can't print or display the distance on the map. Another tool draws a circle around a geographic midpoint, but again, you can't display the radius distance. Pan, zoom-in, zoom-out, and center tools each have several functions; it's hard to tell which function is currently in effect, and a wrong guess can easily ruin a map. You draw rectangles, ovals, polygons, and lines on your map, but you must export the map to a graphics program to color or shade areas or add text. Also, when resizing a map, there's no way to maintain its correct proportions except by eye.

You can export a map only as a PICT file. Exported maps are harder to modify and enhance than MapArt (Cartesia Software), which have more detail and display more rivers and internal political boundaries than do BaseMap maps. (And if you need only a few geographic regions, you can save money by purchasing individual MapArt modules.) If you need high-quality maps in a variety of projections and can afford to spend two to three times as much, Azimuth (Graphsoft) or Geocart (Terra Data) are clearly better choices. In short, BaseMap is not for the cartographic sophisticate. Until it is significantly upgraded, I can recommend BaseMap only for simple maps displaying simple data.—ROBERT C. ECKHARDT



What Becomes a Legend? BaseMap creates a map legend (containing all data categories and their symbols) on demand. You can move the legend around, but you can't change its title or formatting.

Open Sesame 1.02

Finder Automation Utility

PROS: Automates common Finder tasks; elegant interface. **CONS:** Limited automation of third-party applications; may be superfluous for experienced users. **COMPANY:** Charles River Analytics (617/491-3474). **LIST PRICE:** $99.

MW ★★★

SINCE THE MAC'S ARRIVAL, THIRD-party vendors have unveiled a wealth of products designed to make the Finder more powerful. Alas, many add-on solutions well aren't geared to novices; even some of the shortcuts built into System 7—aliases, for example—remain a mystery to many Mac users. Open Sesame is a new utility that automates Finder operations without resorting to macros or scripts.

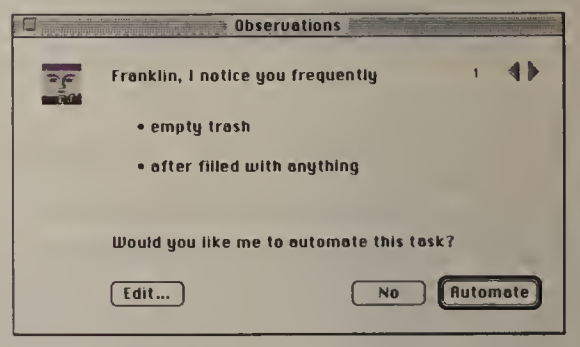
Open Sesame consists of an extension and a start-up application; once it's running, the application discreetly hides in the background. Open Sesame lets you automate up to 12 different types of Finder operations: opening and closing files; hiding, showing, and arranging windows; emptying the Trash; shutting down; making stationery documents; rebuilding the desktop; and moving items into or out of the Apple Menu Items, Startup Items, and Desktop Items folders. (Open Sesame can only rearrange windows of a few applications, such as Microsoft Excel, however.)

A preferences dialog box lets you tell Open Sesame to stop making suggestions for any category of operation. You can specify if you want to be informed about new observations by dialog box or with a less-obtrusive flashing icon in the menu. Open Sesame also gives you the option of being notified by a friendly female voice. (Version 1.1, which should be shipping by the time you read this, will add expanded voice support and the ability to dynamically rearrange the Desktop Folder so that, for example, when you launch your spreadsheet one set of documents and folders appears on the desktop, and when you launch your word processor another set appears.)

A browser lets you view all the observations that Open Sesame has made and turn automated tasks on and off. (If you delete an observation that you once declined to automate, Open Sesame may make the same suggestion again, so it's best to leave them around.) You can create new instructions manually using a straightforward interface.

According to Charles River Analytics, Open Sesame employs sophisticated neural-network technology to make its suggestions. To test Open Sesame, I followed the manual's advice and didn't alter my work routine. After a few hours, Open Sesame began to make new observations. Some, like its offer to automate opening a group of documents or empty the Trash as soon as it was full, were helpful; others, such as the oft-repeated suggestion to open applications at a particular time, weren't as constructive.

For a new category of software, Open Sesame is surprisingly well designed, although people with strict work habits are more apt to find its suggestions worthwhile than are those who don't follow a routine. Open Sesame is also more likely to be attractive to novice or intermediate users. As time goes by, expanded support for Apple events will allow Open Sesame to automate third-party applications, making it even more useful.—FRANKLIN N. TESSLER



At Your Service When Open Sesame makes a new observation, you can automate the instruction, ignore it, or edit it.

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In case you haven't heard yet, PowerPC is a new microprocessor developed jointly by Apple, IBM, and Motorola based on advanced, 32-bit RISC *(reduced instruction set computing)* technology. It will, quite simply, do a lot more in a lot less time—initial clock speeds range from 60MHz to 80MHz *(about twice as fast as the current Quadras)*!

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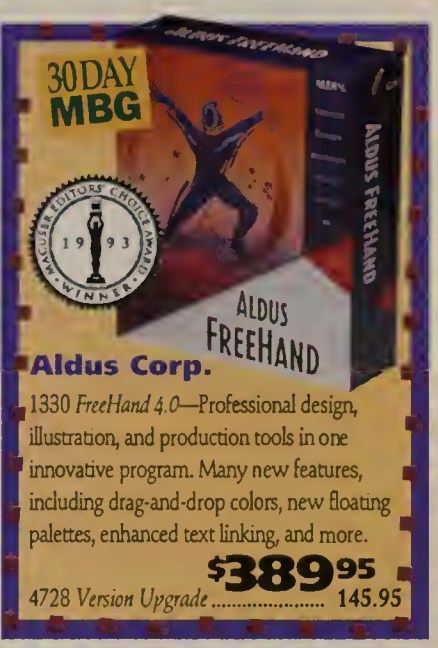
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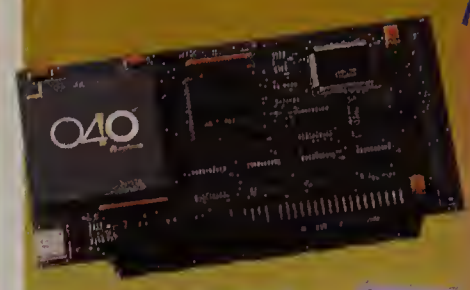
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★ **Golden Triangle ... 30 day MBG**
11731 TimesTwo *(1.44)* ..... 85.
★ **Inline Software ... 30 day MBG**
15850 TimesSquare 49.95
7068 INITPicker or 1740 Redux Dlx 2.01 49.95
★ **Kent Marsh Ltd. ... 30 day MBG**
9513 FolderBolt 73. 1839 NightWatch II. 89.
Metrowerks, inc.
15444 CodeWarrior Bronze ..... 199.
MicroMat Computer Systems
3732 MacEKG II... 89. 2998 DriveTech.... 42.

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6925 Now Utilities 4.0 ..... 84.
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3955 Suitcase 53. 14244 SuperDoubler 79.95
5176 SAM..... 65. 6748 NUM..... 95.

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13601 The Treehouse ..... 36.
★ **Cailisto ... 30 day MBG**
11756 Super Maze Wars 39.95
★ **Davidson & Associates ... 30 day MBG**
2574 MathBlast. Plus or 1076 Zoo Keep. *ea.* 34.
14848 Cruncher ..... 34.
★ **Delta Tao ... 30 day MBG**
13714 Eric's Ultimate Solitaire 36.95
★ **Edmark Corporation ... 30 day MBG**
7155 Kid Desk 24. 7318 Millie's Math Hse. 29.
1078 Bailey's Book House ..... 29.
12989 Thinkin' Things ..... 39.
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1907 PGA Golf 38.95 2805 Tour. Course 18.95
GameTek
13813 Jeopardy or 7433 Wheel of Fortune 24.95
★ **Great Wave ... 30 day MBG**
6693 KidsMath or 2276 Kid's Time Dlx.. 27.95
★ **Inline Software ... 30 day MBG**
11188 Pax Imperia 36.95
9792 Deliverance or 9797 Firefall Arcade 29.95
Interplay Productions
1615 Mario Teaches Typing 29.95
Bridge Dlx or Out Of This World *ea.* 34.95
★ **Leister Productions ... 30 day MBG**
7126 Reunion 3.0 ..... 115.
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14126 El-Fish 36.95 11627 A-Train Combo 44.95
13818 SimCity 2000 39.95 5279 Classic 24.95
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3959 Word Munch 19. 3963 Oregon Trail 29.
★ **Microsoft ... 30 day MBG**
2868 Flight Simulator 4.0 *(CP)* ..... 42.
14214 Creative Writer 42.95
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7723 Lang. Explorer or 7767 ClockShop *ea.* 29.
8260 Word Quest or 7470 Jungle Quest *ea.* 30.
Psygnosis
11562 Lemmings 35. 8720 Oh, No! More 29.
Software Toolworks
15815 Miracle Piano Software ..... *only* 84.95
5201 The Miracle Piano System..... 269.95

★ **StarPlay Productions ... 30 day MBG**
3675 Crystal Caliburn $34.95
Upstlii Software
14140 Mangla 33.95
Voudette
4764 FLOWERscape ..... 48.

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Coda Music Technology
5604 Finale 3.0 549. 12307 Fin. Allegro. 259.
★ **Great Wave ... 30 day MBG**
1014 ConcertWare Pro 1.0 ..... 175.
Macromedia
7651 Action! 219.95. 5087 Director 3.1 849.95
Nova Development
11101 Kaboom! 29. 12278 w/More Kaboom 40.
Radius
1738 PrecisionColor Pivot *(req. interface)* 899.95
14597 PhotoBooster 849.95
RasterOps PaintBoard Series
14750 Lightning 849.95 12909 Turbo XL 1199.
Sony Multiscan Trinitron Monitors
10529 CPD-1730 17" ..... 1099.
★ **SuperMac/E-Machines ... 30 day MBG**
12704 20"+Color 1849. 10321 Col.Pg. T16II 1299.
10322 Presenter or 8028 Futura IISX... *ea.* 469
8005 Ultura LX 1199. 7985 EtherDock. 649.

CD-ROM

★ **Claris Clear Choice ... 30 day MBG**
13907 From Alice To Ocean *(book w/CD)* 46.95
Broderbund
13600 The Tortoise and the Hare ..... 34.
13602 The New Kid on the Block ..... 34.
FWB, Inc.
10198 CD ToolKit ..... 49.
★ **Microsoft ... 30 day MBG**
1741 Musical Instruments on CD-ROM ..... 55.
PhotoDisc, Inc.
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11330 The Journeyman Project 44.95
Software Toolworks
12968 The Animals! 54.95
★ **Spectrum Holobyte ... 30 day MBG**
1485 Iron Helix 59.95
Time Warner
7454 Hell Cab 1.0 *(CD-ROM)* 64.95

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Apple Computer
7073 Mac PC Exchange ..... 59.
10453 AppleShare 4.0 1469. 14576 Upgd. 539.
7101 AppleTalk Remote Access 1.0 ..... 149.
14231 Remote Access 2.0 Client for Mac 54.95
Asanté Technologies, Inc.
Asanté Lite Ethernet Cards ..... *ea.* 125.
2775 10/T Hub-8 249. 2772 10/T Hub-12 499.
BDCA Research
11052 M1441 V.32bis FaxModem 159.95
Coactive Connectors
1184 Mac... 29.95 1189 Mac to PC... 164.95
CommForce
15862 4-Sight 599.95
★ **CompuServe ... 60 day MBG**
1676 Membership Kit ..... 25.
1673 Navigator 3.2 ..... 49.
★ **DataViz ... 60 day MBG**
1823 MacLink Plus/PC Connect 7.5 ..... 129.
12613 MacLink Plus/Easy Open Translators. 69.
12093 MacLink Plus/Translators Pro 7.5 ..... 95.
★ **Dayna ... 60 day MBG**
11878 DOS Mounter Plus 54.95
8719 EtherPr. or 9888 *(10BASE-T) ea.* 339.95



30 DAY MBG

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15850 *TimesSquare*—Get your schedule in line! This easy-to-use, multi-user scheduler has an integrated to-do list, a fast Find function, color labels, support for Speech Manager, and more. **$49.95**



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- 7945 *Retrospect Remote 2.0*—Powerful Mac network backup software. For automatic, centralized backup and archiving. Supports compression, encryption, & verification. **$259.**
- 3393 *DiskFit Pro 1.1*—A fast and efficient data backup solution ..... 72.



GCC TECHNOLOGIES

14247 *WriteMove II Portable Printer*—Small enough to fit in a briefcase, weighing just 2 pounds! Thermal fusion printhead for laser-quality, 360 dpi output on plain paper. Measures less than 12"x4"x2". **$399.95**

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7437 1-4MB *(80ns)* ..... 189.

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11654 *PB165C* 8MB
11653 *PB165C* 10MB 549.95
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15097 *MDS 44 (without cartridge)* **$239.95**
8141 *MDS 44 (with cartridge)* ..... **299.**
10590 *MDS 88c (also R/W 44, w/cart.)* ... **489.**



15002 *HP DeskWriter 310 Inkjet Printer*—1993 Eddy Award Winner and perfect companion to your PowerBook! Delivers crisp 300 dpi output, 3 pages per minute. Folds for easy transport. **$329.95**

8368 *HP LaserJet 4M Printer*—Prints up to 8 ppm at 600x600 dpi. RISC-based processor. 6MB memory, Adobe PostScript Level 2 & PCL 5. Three active I/O ports allow for easy printer sharing. **$2079.95**

7970 *LaserJet 4 Toner Cartridge* **109.95**

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10080 FaxPRO for Macintosh 1.5 ..... $79.95
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11696 Etherthin Mac/PB ..... 309.
11499 EtherWave AAUI Transceiver ..... 109.
4869 PhoneNET Connector 10-Pk *(DIN8)* 195.
14545 Timbuktu Pro 135. 4866 Remote 129.
9516 PowerPath 105. 9518 LocalPath. 139.
6922 Replica/Mac 69.95 7407 *(10 user)* 499.95
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6115 White Knight 11 ..... 85.
14804 Second Sight 119.95
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Hayes
10822 ACCURA 2400 74.95 11422 96 Fax 159.95
11419 ACCURA 144+Fax144 ..... 169.95
2300 Smartcom II 84.95 5971 OPTIMA 24 119.
Insignia Solutions
7557 AccessPC 3.0 ..... 79.
4089 SoftPC... 109. 10554 SoftPC Pro... 215.
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8063 PM14400FX FaxModem 429.95
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★ **Shiva ... 30 day MBG**
6555 LanRover/L ..... 599.
14837 NetModem/E ..... *ea.* 1479.
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1964 MicroPhone II 109. 3455 Pro 139.95
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Ethernet Adapters ..... call
★ **STF Technologies ... 30 day MBG**
7639 FaxSTF 3.0 ..... 39.95
SupraFAXModems
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5337 14400LC 164.95
★ **Synergy ... 30 day MBG**
6618 VersaTerm 5.0 109.95 6619 PRO 169.95
Technology Works
1582 GraceLAN ..... 449.
U.S. Robotics
11842 Sportster 14.4 Mac & Fax ..... 229.
★ **Zoom Telephonics ... 30 day MBG**
7757 FaxModem AFX 69.95
3553 FaxModem VFX V.32bis 164.95
14152 FaxModem VFX 14.4V for Mac..... 174.95
7917 FaxModem PKT *(pocket)*..... 79.95

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8361 1.44MB HD Drv. 229. 5290 Pls. Drv. 299.
10282 TransWarp 4300 *(40MHz, no FPU)*. 399.
★ **DayStar Digital ... 30 day MBG**
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1312 040i 20MHz 599.95 1302 33MHz 799.95
1670 PowerCache 50MHz *(no FPU)*..... 459.95
FWB, Inc.
9529 PocketHammer 170 ..... 459.95
14322 PE 340 FMF 579.95
14318 PocketHammer1000FMF 1349.95
tOMEGA
6499 90MB Transp. *(reqs. interface)*... 479.95
2467 90MB Gold Std. Rem. Cart. *(3)* $289.95
8781 Mac Transportable 90 PRO 369.95
10499 Transportable MultiDisk 150 ..... 479.
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Peripheral Land (PLI) full line available
11470 Infinity 88/RW 44 ..... 549.

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1482 Game Pad 39. 9963 MouseStick II 69.
★ **Appoint ... 30 day MBG**
Mac Crayon *(red, blu, grn or yel) ea.* 32.
Caere
4930 OmniPage Pro 489. 7705 Direct ... 189.
7925 OmniScan ..... 399.
CoStar
1885 Stingray ADB 79.95
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9830 MAC101E 129. 2384 w/QuicKeys 159.
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15339 SelectPress 600/600 Pro Printer 3749.95
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Hewlett-Packard LaserJets
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Interex Computer Products
12862 105 Key Deluxe Keyboard ..... 99.
★ **Kensington ... 30 day MBG**
2547 Turbo Mouse 4.0 ADB..... 107.
Key Tronics
6974 Mac Pro+Keybd 135. 1070 TrakPro 219.
★ **Microtek Labs, Inc. ... 30 day MBG**
13815 ScanM. IIG 499.95 13814 IISP 779.95
★ **Mouse Systems ... 30 day MBG**
7520 Litt. Mouse ADB or 8001 Plus *ea.* 69.95
★ **Soph. Circuits ... 30 day MBG**
8009 PowerKey 75. 8008 Remote.... 32.
★ **TI microLaser Pro 600 ... 30 day MBG**
13658 PS23..... 1399. 13659 PS65..... 1599.
UMAX
13748 UC630 719.95 13751 UC1260 1469.95

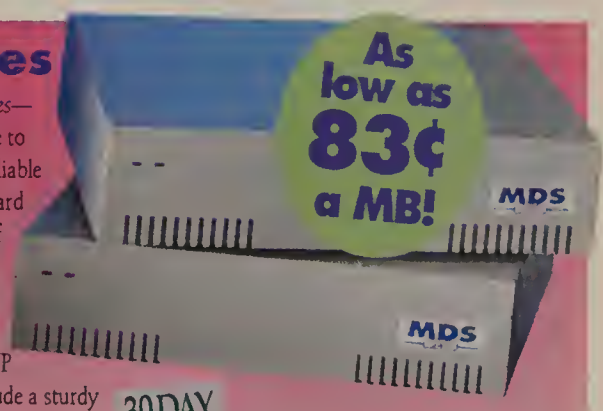
ACCESSORIES

Apple Computer
11663 StyleWrit. II Cart. 23. 11669 *(3 pk.)* 63.
LaserWriter Toners: Pers. 65. LW II 85.
Disks/Carts.: BASF, Fuji, 3M, Sony
★ **I/O Design Cases ... 30 day MBG**
8812 Ultimate Class. 62.95 1941 Ult. LC 89.95
13549 PowerBook Leather Satchel *(black)* 77.95
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7369 Notepac 35.95
13941 Business Commuter Case 114.95

MDS Drives

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11881 *120MB ZFP Hard Drive* **$289.95**



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11863 *540MB ZFP Hard Drive* **799.95**
15117 *1.2GB (Fujitsu) ZFP HD* **999.95**
2219 *1GB (Quantum) ZFP HD*.... **1089.95**



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Texas Instruments

13658 *TI microLaser Pro 600 PS23*—Photo-quality, 600 dpi with 8ppm RISC power. 500-sheet capacity, 6MB, Adobe PostScript level 2 w/23 fonts, PCL5, Mac/PC ready. **$1339.**

13659 *microLaser Pro 600 PS65* ..... **1599.**



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Claire, The Personal Music Coach 1.0.1

Musicianship Program

PROS: Good introduction to the mechanics of music. **CONS:** Single curriculum module leaves room to grow. **COMPANY:** Opcode Systems (415/856-3333). **LIST PRICE:** $129.95.

MW ★★★★

SOLFÈGE, THE SYSTEM OF ASSIGNing Italian syllables (*do*, *re*, *mi*, and so on) to musical notes, is the method commonly used to teach musicianship—that is, pitch and interval recognition, sight singing, and intonation. It's the bane of many a freshman music major, a profit center for the grad students who tutor them, and an essential part of a musician's training.

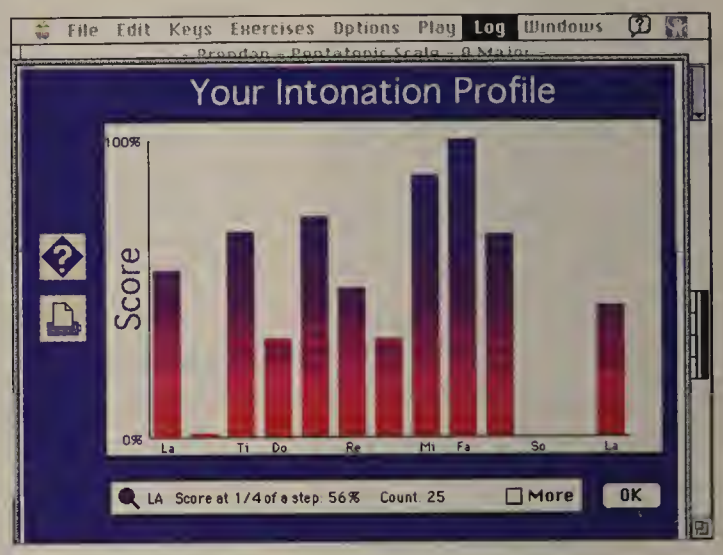
Claire could forever change the way musicianship is taught. The program designs a 500-exercise curriculum based on your age and level of musical knowledge. A warm voice steps you through the process of determining your vocal range and a comfortable key, then introduces the exercises, providing encouraging words throughout. You sing into the Macintosh's microphone, and Claire's pitch-recognition algorithm determines the note and how accurately you have sung it, within a tenth of a half-step.

The interface, while nonstandard for the Mac, is logical and easy to learn. Claire tracks each user's progress and charts pitch accuracy. The exercises flow logically and build a solid foundation of musicianship. Claire even suggests you don't overdo it, prompting you to take regular breaks.

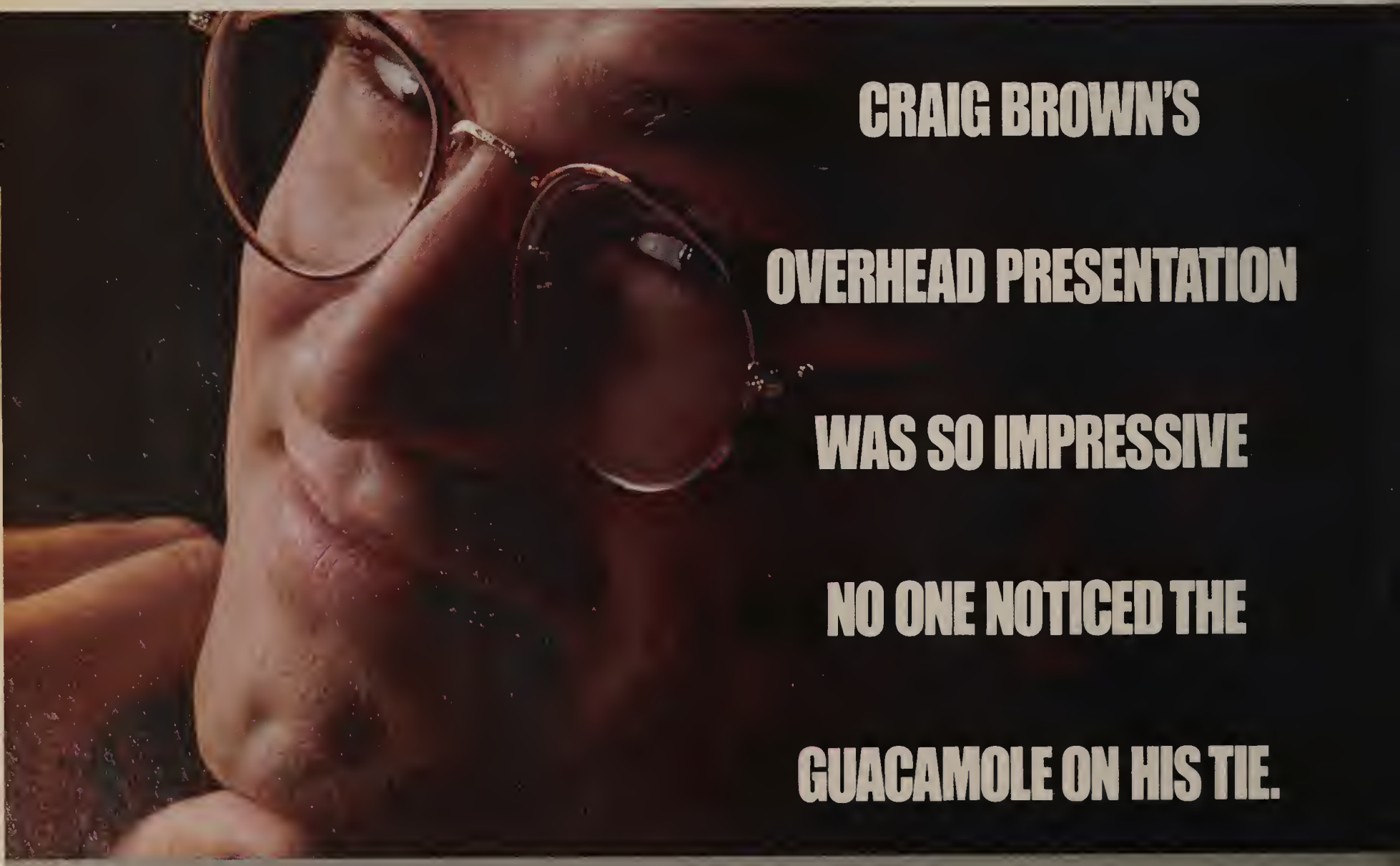
The initial release of Claire had its share of glitches. At the start of my tour of the program, the required New User Registration screen was off my monitor, somewhere in cyberspace. I quit the program, reloaded it, and selected New User from the File menu, and the registration screen appeared in position. Other bugs ranged from mildly annoying—the program sometimes galloped at double speed, accusing me of singing in an octave I can't begin to reach—to amusing, such as when Claire echoed the last bit of speech (often "Good" or "Excellent") when I stopped in the middle of an exercise. None of the problems were fatal, and Opcode has since cleaned them up; version 1.0.1, now shipping, is going out to all registered owners.

Nested under Claire's Edit menu is an item called Modules, which now contains only Solfège. Other modules are being developed with sound files and intonation profiles for instrumental musicians. Opcode will sell these modules separately.

Opcode, marketing for developer Arpeggio Software, will find a large and receptive educational market for Claire. With its reliance on repetition and accuracy of pitch, teaching musicianship lends itself to automation, and many of the educational markets already have a large Macintosh presence.—RICHARD FENNO



Keeping Score Claire provides detailed charts for keeping track of a student's progress.



Smart Label Printer Pro

Label Printer

PROS: Small footprint; excellent print quality; very fast. **CONS:** Software's abilities are limited; label size is too restricted; expensive. **COMPANY:** Seiko Instruments (408/922-5900). **LIST PRICE:** $299.95.

MW ★★★

IT'S EASY TO CREATE LABELS ON THE Mac, but printing them can be a chore. The Smart Label Printer Pro is an attempt by Seiko Instruments to address the Macintosh user's label-printing dilemma.

The SLP Pro is a small, black-and-white thermal printer that comes with a desk accessory for designing labels. Measuring about 4 by 9 by 6 inches, the printer is also lightweight and simply designed. It prints quickly, and the output quality is very good. Still, the SLP Pro's usefulness is limited by its restrictive label requirements, its inadequate software, and its high price.

The SLP Pro lets you print labels up to 2⅛ by 4 inches, but Seiko's thermal printing technology requires using Seiko's own thermal labels. Forget about using premade labels or labels from a stationery store.

The SLP Pro desk accessory allows you to customize label templates, add POSTNET codes and graphics, and import and export data files. It comes with eight predefined templates. You print labels from mail lists, which can contain multiple names. You can choose to put personal messages on labels you specify.

The software also lets you create bar codes—though the product's manual admits that infrared scanners can't generally read thermal printing, so anyone who wants scannable bar codes should look elsewhere.

Labels can only be printed from the SLP Pro DA; at press time, Seiko was working on a Chooser-level driver that would let you print from any application. Seiko expected the driver to ship in February.

The import function of the software is quite limited. I imported addresses from a FileMaker Pro database to create a label list. In the database, I had separate fields for salutation, first name, last name, and so on. In the SLP Pro software, each field was separated by a carriage return. The software wouldn't let me specify where the fields should appear. A Seiko technical-support staffer told me I'd have to edit the exported file before importing. That's hardly an acceptable solution for users needing to print many labels from imported data, especially since printing labels on a standard inkjet or laser printer isn't that hard.

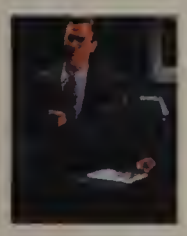
I don't think the SLP's high price and limited abilities make it a worthy product for printing lots of labels. Consumers may find their standard office printer a cheaper, more efficient solution. But if you need to print only a few labels at a time, the SLP Pro, which prints quickly and well, may be an expensive but good choice. Now if I could only find something that would stick the labels on the envelopes, too.

—JOANNA PEARLSTEIN



ROBERT PERRY

The Smart Label Printer Pro from Seiko



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KODAK
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Pagemaker V5.0	539.23
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Pagemaker V5.0 license	449.48
Personal Press V2.0	96.06
Persuasion V2.1	304.31
Persuasion V2.1 license	248.45
Pre-print V1.6	311.35
SuperCard V1.6	125.54
SuperPaint V3.5	93.27
Touchbase Pro V3.0	44.34

Altsys

EPS Exchange V2.0	85.93
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Metamorphosis Pro V2.04	85.94

Ares

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Aladdin StuffIt Space Saver	34.19
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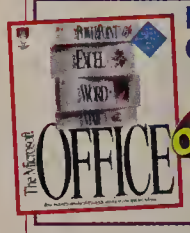
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THE POWER MACINTOSH ARRIVES

See, touch, and smell one of the three new computers that Apple introduced on March 14 and you know they're Macs, yet they are also obviously a decidedly new breed of Macintosh.

THREE NEW MODELS REDEFINE MACINTOSH PERFORMANCE WITHOUT SACRIFICING COMPATIBILITY

BY LON POOLE & GALEN GRUMAN

You hear a subtle difference at start-up, when instead of a chime you hear a guitar chord strummed by jazz guitarist Stanley Jordan. (There's also a scary car-crash sound if there's a major problem at start-up.) Decidedly more prominent is the new machines' sensation of speed. Macworld Lab tests proved these Power Macintosh computers capable of performing two to six times as fast as a Quadra 800. To put that performance in perspective, it's been seven years since a new Mac has tripled the speed of the previously fastest Mac. (The Mac II, in 1987, tripled the speed of the Mac Plus.)

The new business-class Macs get their performance boost not from a faster Motorola 680X0 CPU but from a completely different CPU, IBM's PowerPC 601. The 601 is faster because its RISC (reduced instruction set computer) architecture processes instructions much faster than the 680X0's CISC (complex instruction set computer) architecture.

There are three models of the Power Macintosh: the 6100, 7100, and 8100. To a casual observer, they look pretty much like a Quadra 610, 650, and 800, respectively. Although it's the PowerPC 601 inside that largely sets them apart, there are some other notable differences: all have built-in Ethernet circuitry, all have AV configurations via an expansion card

The Power Macintosh 6100/60AV, 7100/66, and 8100/80 (clockwise from left).

(and even the non-AV configurations include telephony, speech, and hi-fi stereo capabilities), all support multisync monitors and on-the-fly resolution switching, all support an optional cache, and all configurations but the non-AV 6100 have two video ports.

Apple has also taken a step toward making its product names more meaningful. Many people have difficulty remembering how the CPU speed of a Quadra 650 compares with, say, a Centris 650, Quadra 800, or Quadra 700 (33MHz, 25MHz, 33MHz, and 25MHz, respectively)—and their names don't help. The Power Macs will include the CPU speed as part of their names. Thus, the Power Mac 6100/60 uses a 60MHz PowerPC 601 CPU, while the 7100/66 and 8100/80 use 66MHz and 80MHz CPUs, respectively. If Apple were to come out with a 66MHz 6100, it could be called a 6100/66 rather than have a whole new name.

You might expect to pay a premium for these fast new machines. But the clearest evidence so far that Apple is targeting the mass market is the fact that Apple expects dealers to sell the Power Macs for (and the prices in its own direct-sales catalog will be) about $2000 for a complete 6100 system, $3000 for a 7100 system, and $4000 for an 8100 system. That's just $200 to $400 more than the equivalently configured Quadra 610, 650, or 800.

Looks Like a Mac, Acts Like a Mac

A new CPU architecture could bring big compatibility problems, but Apple has made sure the new computers are Macs in more than name and case dimensions. The Power Macs look and act just like all other Macs. Almost all the software you already have works with them as is, and so does most of your add-on hardware.

Macworld Lab's tests on prototype Power Macs found just three incompatibilities in the more than 100 applications and system extensions tested: only Kent Marsh's CryptoMactic file-encryption program, Aldus's PageMaker 4.2 (PageMaker version 5.0 is fine), Jump Development Group's OptiMem 1.5.X, and Kiwi Software's Power Menus 1.0 Finder enhancement did not work (Power Windows is fine). Neither do the system extensions that make accelerated 24-bit video cards function in accelerated mode; SuperMac and Radius have promised free updates and low-priced ROM updates (see *PowerPC News*, *Macworld*, April 1994), but other companies had not detailed their upgrade plans at press time.

In some other cases, an application works only with the Power Mac's version of the Memory Manager turned off (this turns on the 680X0 Memory Manager, at the expense of about a 10 percent drop in performance). The only example we found was Symantec's Think C 5.0.

The one catch—a big one—is that this degree of software compatibility incurs a significant performance penalty. When running existing software written for 680X0 CPUs, the Power Macs deliver performance at speeds between those of a IIci and Centris 650, according to Macworld Lab tests. Most run at IIfx-to–Centris 610 speeds. Even the top-of-the-line 8100 has only about 80 percent of the speed of a Centris 610 or Quadra 605 when running 680X0 software. Clearly, no one will buy a Power Mac just to run emulated programs. (The benchmarks in "How Fast Is 680X0 Emulation?" show how typical business programs fare in 680X0 emulation.)

The performance you see on a Power Mac when running 680X0 software will depend greatly on the programs that you use and the functions within them that you use, since how they interact with the Power Macs' partially emulated operating system plays a large role in determining actual performance.

Only new or upgraded software written specifically for the PowerPC CPUs

MW LAB How Fast Is 680X0 Emulation?

Best result in each test.
Times are in seconds.
Shorter bars are better.

These results reflect the performance of 680X0 software under emulation on a Power Mac. Macworld Lab tested prototype Power Macs, so actual performance may differ slightly. Native PowerPC software should be much faster (see the feature "Power Mac Software," in this issue). The sidebar "Behind Our Tests" details the applications used.

	SOFTWARE PERFORMANCE		HARDWARE PERFORMANCE		
	Processor Indicates raw processing power, which affects almost all aspects of performance.	**Floating Point**[1] Indicates performance on tasks that rely heavily on a math coprocessor (FPU).	**Video Display** Indicates performance on tasks that depend heavily on screen-redraw speed. Most Power Macs have two video ports; we tested both.		**Drive Access** Indicates performance on tasks that rely heavily on the hard drive.
			Back-panel video port[2]	**PDS-card video port**[3]	
Power Mac 8100/80AV (1GB drive)	256	187	73	74	57
Power Mac 8100/80 (1GB drive)	256	187	73	66	57
Power Mac 7100/66AV (500MB drive)	383	348	104	83	74
Power Mac 7100/66 (500MB drive)[4]	335	242	78	75	65
Power Mac 7100/66 (500MB drive)	383	348	104	96	74
Power Mac 6100/60AV (250MB drive)	386	354	116	114	80
Power Mac 6100/60 (250MB drive)	380	377	116	NA	80
Quadra 800 (external 230MB drive)	129	70	52	NA	54
Centris 650 (external 230MB drive)	162	88	65	NA	60
Centris 610 (external 230MB drive)	201	108	77	NA	64

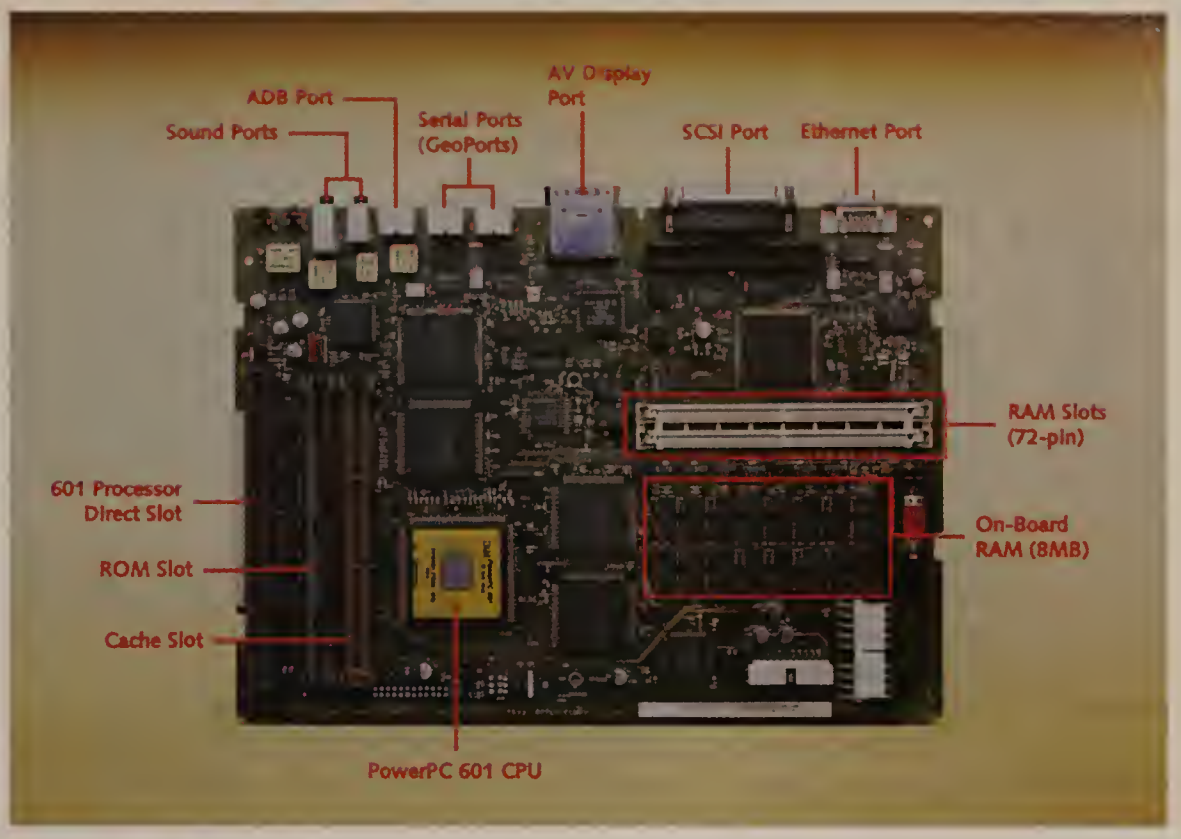
NA = PDS-card video not available for these Macs. [1]Tested without memory interleaving active; interleaving typically boosts performance by 5 percent. [2]On Power Macs, this is RAM-based video; on other Macs, it is VRAM-based. [3]On AV Power Macs, the AV card includes the video circuitry. [4]With 256K cache installed.

TESTING NOTES: We conducted the floating-point tests without Specular International's Infini-D, since it requires a 680X0 FPU not emulated on a Power Mac. The video tests show performance for typical business programs under 680X0 emulation. According to tests with beta native PowerPC versions of graphics software, a Power Mac's back-panel video should be 15 percent faster than a comparable Quadra's, while a Power Mac's AV-card video should be about 20 percent slower.

achieves the full speed potential. Software that performs lots of floating-point calculations benefits the most from being revised for the PowerPC—two to six times, according to Macworld Lab tests of beta native-PowerPC software. (See the feature "Power Mac Software," in this issue, for more details on native PowerPC software performance.)

For hardware, Macworld Lab also found extremely few incompatibilities. For example, we tried several NuBus cards in prototype Power Macs and found only a few problems, all apparently related to the cards' ROM or INITs, not to the PowerMac's NuBus architecture. The SuperMac Thunder II GX•1360 video card wouldn't work, apparently because its driver software needs an FPU (floating-point unit) but can't use the 601's internal FPU. (Several companies did say privately that a flaw in the Power Mac's NuBus controller required fixes to some third-party boards or drivers.)

Asanté Ethernet cards didn't work when used to connect multiple Power Macs together, but an Asanté card in a single Power Mac did work fine when connected to a different Power Mac's built-in Ethernet circuitry. All the Power Macs have built-in Ethernet, so it's unlikely you'd want to add an Ethernet card.



Not-So-New Motherboard Based on a Quadra 610, the Power Mac 6100/60 shares many components with the 610.

Color Options for All

Apple made major changes to the Power Mac's video-display support. The two most significant changes are the inclusion of two video ports in all models but the non-AV 6100, and the adoption of multisyncing support—even on-the-fly resolution switching—in the Power Macs' ROMs. After years of bypassing PCs' VGA and SuperVGA video standards, Apple has adopted them in the core of its new-generation Macs. Many Macs support multiple monitors with the addition of NuBus video cards, but the Power Macs (except the standard 6100) are the first Macs ever to support two monitors without additional hardware.

One video port is on the Macs' back panel, where it has been on Macs since the IIci. The second video port is on a card that plugs into the PDS (Processor Direct Slot). All AV Power Macs have an AV card in the PDS, and that card includes the video port and 2MB of video RAM, plus the TV-signal input and output connectors. The PDS in the non-AV 7100s and 8100s has a video card in place of the AV card; the 7100's card has 1MB of VRAM, expandable to 2MB, while the 8100's card has 2MB expandable to 4MB. (The non-AV 6100 has no second video port, and there is no option to add one; you'd have to buy a 7-inch NuBus video card from another company and attach it via a $99 PDS-to-NuBus adapter similar to that in the Centris and Quadra 610. However, the adapter for the 610 will not work in a 6100.)

The port on the Power Macs' back panel is an AV-style video port, which has pins for the video, ADB (Apple Desktop Bus), and sound signals that an Apple AudioVision 14 or compatible monitor accepts. If you want to plug a standard Apple monitor or a VGA monitor with an adapter cable into this port, you'll need an AV-to–standard-Mac video adapter. Fortunately, the second video port on the Power Macs is a standard Mac video port, so you really only need this adapter on the non-AV 6100, which comes with one.

The back panel's video circuitry handles standard Apple monitors as large as 16 inches, as well as 13-inch VGA monitors. Instead of using dedicated VRAM for video, the back-panel video uses part of the ordinary system RAM to provide up to 16-bit color depth (32,768 colors) on 12-, 13-, and 14-inch monitors, and up to 8-bit depth (256 colors or gray shades) on 15-inch-portrait and 16-inch monitors. The amount of RAM used depends on the screen size and color depth; a 16-bit, 14-inch (640 by 480 pixels) screen uses the most: 0.6MB.

RAM-based video has a checkered past. It hampers video and system performance on the Mac IIci and IIsi, the most recent business models to use the technique. But Apple claims that by taking advantage of the 601's internal 32K cache and the system's high-volume, multiple-bus architecture, the built-in video uses no more than half the bandwidth (carrying capacity) of the system bus and thus performs well on the Power Macs.

Macworld Lab tests confirm that the Power Macs' video-display speed is fairly fast—but only with native PowerPC software. Our tests with 680X0 applications running in emulation show that both the RAM-based video and the PDS cards' video is two-thirds the speed of a Quadra's or Centris's video. This surprising result seems to be due to overhead incurred by 680X0 emulation, although Apple could not be certain.

The PDS card's video circuitry can handle any standard Mac monitor from 12 to 21 inches, as well as any VGA or SuperVGA multisync monitor at the equivalent pixel resolutions. Most multisync monitors need a special adapter for each pixel resolution to tell the Mac what their resolution is; electronics stores carry these for 14-inch (640-by-480-pixel resolution) monitors, and most monitor makers have adapters for higher resolutions.

The AV cards and the 7100's and 8100's bundled video cards all support up to 24-bit color on monitors up to 14 inches, and 8-bit gray-scale on a 15-inch portrait monitor. Beyond that, color depth depends on the amount of VRAM available. A 16-inch monitor can display 16-bit color with 1MB of VRAM or 24-bit color with 2MB or more. A 19- or 21-inch monitor can display 8-bit color with 1MB, 16-bit color with 2MB, or 24-bit color with 4MB of VRAM. (The amount of VRAM available on an AV card is 1MB if the TV-video ports are active and 2MB if they are not.)

Unlike previous Macs, the Power Macs let you switch the resolution of a

Making AV Technology Mainstream

Think again, if you thought the audio and video technologies of the Quadra 840AV and 660AV were only for multimedia enthusiasts. Audio and video technologies require both a 68040 CPU and a DSP coprocessor on the Quadra 840AV and 660AV, but the PowerPC 601 CPU handles them unassisted on the Power Macs. All Power Macs can send and receive faxes and data over the phone lines without a modem. They can play and record stereo sound with CD fidelity. They can recognize voice commands and synthesize speech. Additionally, any Power Mac equipped with an AV card can record QuickTime movies from a camcorder or other video source, and can show screen images on a TV or send them to a video recorder.

Telephony Connecting a telephone line to either of the Power Mac's two GeoPorts requires an adapter box, called a pod, such as the GeoPort Telecom Adapter that Apple developed for the 840AV and 660AV Macs. This device, a box about the size of a paperback book, works with ordinary analog phone lines. Other companies are still working on pods for PBX (private branch exchange) and digital phone lines. Once connected to a phone line, the Express Modem software included with all Power Macs provides all the capabilities of a 9600-bps fax modem. Applications that turn a Power Mac into a telephone or answering machine won't be available until software developers get some missing pieces of the operating system from Apple later this year.

Audio The audio circuitry on every Power Mac motherboard records and plays back stereo sound with a 16-bit sampling resolution at sampling rates of up to 44.1kHz, the standard for compact discs. This sampling rate and resolution provides far higher fidelity than other Macs' 8-bit, 22kHz best, but it uses lots more disk space as well: 10MB per minute. The signal-to-noise ratio is 82dB for input and 85dB for output, the same as the 840AV and nearly as good as an audio CD's 90dB.

Speech The PlainTalk technology built into every Power Mac can recognize voice commands of most North American English speakers without any training, Apple says. The Power Mac's high-fidelity audio circuitry digitizes spoken commands, and the PlainTalk software compares the digitized sound with its database of almost 1000 voice samples. This processing happens faster in the floating-point unit of a Power Mac's 601 CPU than in the Quadra 840AV's 3210 DSP, according to Apple. Furthermore, the 3210 cannot process PlainTalk and GeoPort tasks concurrently, but the 601 can. As a result, Apple says, the Power Macs can recognize speech during a 9600-bps data-communications or faxing session—a feat the 840AV Mac cannot perform.



Besides recognizing speech, PlainTalk can generate speech from text with more realistic voices than the Mac's original speech-generator, MacinTalk. But PlainTalk uses lots of memory—2MB for speech recognition and 700K to 2.6MB (depending on quality) for speech synthesis.

TV video The AV Power Mac configurations include a separate circuit card—the AV card—that inputs television video and outputs ordinary Macintosh video or television video. Essentially, this card contains the video subsystem of a Quadra 840AV, stuffed with 2MB of VRAM.

The AV Card plugs into the PDS slot on the Power Mac motherboard and adds three ports to the back panel. One port is an ordinary Mac video monitor port (not an AV display port with sound, ADB, and video input like the one on the motherboard). The other two ports are for S-Video input and output. There are no composite (RCA-style) video-input and -output ports, but the AV card includes adapter cables for the S-Video ports. The AV card also has a 40-pin DAV (Digital Audio Video) slot like the one on the Quadra 840AV and 660AV. The DAV slot gives NuBus cards access to the computer's digital-audio and TV-video–input signals. On an 8100AV or 7100AV, an accessory card in the DAV slot could compress digital video and audio and send it to a NuBus card over a flat-ribbon cable. (A 6100AV can't use the DAV slot because it can't have both an AV card and a NuBus card installed.)

Apple does not claim the AV card produces broadcast-quality TV video, but its NTSC video output (the TV standard for North America and Japan) has a convolution filter to reduce flicker. The AV card can also output PAL video (for most of Western Europe), but SECAM (for France, Eastern Europe, and Russia) requires an external adapter.

Apple claims the AV card can digitize a QuickTime movie in 16-bit color at about 28 frames per second on a 6100/60AV, 31 fps on a 7100/66AV, and 37 fps on an 8100/80AV. Standard SCSI performance (5MB per second maximum) theoretically limits frame size to 320 by 120 pixels when recording digitized video to a hard drive, in real time, without compression. In theory, an 8100/80AV could record a larger video window on a SCSI-2 Fast internal hard drive. The AV card can also grab a single video frame and save it as a 24-bit PICT file, and it can display continuous full-screen video at the standard broadcast frame rate. The AV card accepts TV video in three formats: NTSC, PAL, and SECAM.

Although the AV card can digitize movies in 16-bit color, it must be set to display only 8-bit color while digitizing. After recording a movie, you can set the Monitors control panel to display more colors while you view or edit the movie. The 2MB of VRAM (not expandable) are enough for 24-bit color on a 16-inch monitor (832 by 624 pixels) and 16-bit color on a 19- or 21-inch monitor.

BY LON POOLE

multisyne monitor with the Monitors control panel. (You need speeial software for older Maes, as well as updated software and perhaps ROMs for some third-party NuBus video eards.) The resolution switehing does not require a restart, whieh means you ean switeh resolutions, say, to make the sereen easier to see during a presentation or to inerease sereen-redraw speed while aeeessing a system via Apple Remote Aeeess.

Software Selections

The Power Macs eome with System 7.1.2, a minor variant of System 7.1. In addition to Power Mae enablers, 7.1.2 has the Express Modem software to simulate a 9600-bps fax modem, Maeintosh PC Exchange to mount PC disks, QuiekTime to play baek movies and deeompress graphies, AppleSeript to create application seripts, and a new Graphing Caleulator to perform complex scientifie ealeulations and show the results visually. The AV configurations eome with VideoReeorder for viewing TV-video input in a window. Apple also offers a eonfiguration that ineludes 16MB of RAM and Insignia Solutions' SoftWindows Windows emulator installed on the hard disk.

All the Power Maes include eontrol panels to sehedule automatie shutdown of the Power Mac and monitor to eonserve power, as part of the Environmental Proteetion Ageney's Energy Star program to reduce power consumption. (A monitor must be Energy Star–compliant for the automatie shutdown to work with it.) The Power Mae 6100 is not Energy Star–compliant because the system cannot be powered down via software, although attaehed Energy Star–compliant monitors ean. The 6100—like the Centris and Quadra 610, Quadra 605, and LC III—has no eireuitry to support the keyboard's restart switeh, whieh is why the system-shutdown software does not work with it.

Notable software omissions inelude the PowerTalk extensions for network communications and eollaboration (available in System 7 Pro) and the long-awaited QuiekDraw GX enhaneements to the Mae's basic graphics, typography, and printing eapabilities. PowerTalk should be available this summer, aeeording to Apple, while QuickDraw GX remains in development. Also missing is ApplePhone, whieh ereates a telephone and answering maehine in software on a 660AV or 840AV but requires the DSP ehip in those Maes.

Rather than rewrite all of System 7 with native PowerPC code, Apple put a 580K emulator program in the Power Mac's 4MB ROM to translate 680X0 instruetions to PowerPC instructions on the fly. (For more details on how Apple's 680X0 emulation works, see "PowerPC Preview," *Macworld*, February 1994.) The emulator does not translate MMU (memory management unit) or FPU instruetions. Almost no programs eommunieate direetly to the MMU, but several high-end programs—notably modeling, rendering, and seientifie-analysis software, but also some Photoshop image filters sueh as Lens Flare—do require an FPU. 680X0 programs that require an FPU will not launch, or will erash, if you use them on a Power Mae.



Hardware Differences The PowerPC 601 CPU (top) has a new heat-sink design. The Power Macs (middle) also use the AV Macs' video connector and GeoPorts (a Quadra 650's ports are shown at bottom for comparison).

For 680X0 programs that require an FPU, John Neil's $10 shareware eontrol-panel SoftwareFPU 2.43 (available on CompuServe and Ameriea Online) sueeessfully emulates a 68040 FPU on Power Maes. While it's not very fast, Software FPU does let you keep using 680X0 programs that require an FPU until you ean upgrade them to native PowerPC versions. For example, SoftwareFPU let Maeworld Lab use Specular International's Infini-D to render an image, but what takes about 11 minutes on a Centris 650 took more than 19 hours on a Power Mae 7100, sinee Infini-D had to use the emulated FPU instead of a real one. For smaller tasks, like using the Lens Flare image filter in Photoshop, the performanee is aeeeptable, taking 30 seeonds rather than 12. (Ironically the Quadra 605 and other Macs with 68LC040 CPUs, whieh lack FPUs, can't use SoftwareFPU due to a bug in the LC040 CPU; see *Quick Tips*, *Macworld*, March 1994.)

Apple has also revised the Memory Manager portion of the Maeintosh Operating System to inelude dynamie file swapping so the memory sizes you set in Get Info windows would be equivalent for native PowerPC applieations and emulated 680X0 applieations. For the applieations that are ineompatible with the new Modern Memory Manager, you ean set a new option in the Memory control panel to use the old Memory Manager.

System 7.1.2 also adds built-in support for shared libraries, whieh are software modules that extend application eapabilities. Several applieations already have private or semiprivate modular extensions (Photoshop filters, for example), but shared libraries are a systemwide standard supervised by the Shared Library Manager portion of the operating system (a separate system extension before System 7.1.2). Shared libraries on Macintoshes are similar to the popular DLLs (dynamie linked libraries) on Windows PCs. A software library module ean be designed to work with one applieation or many, and applieations can link to modules on the fly. For example, word proeessor and database applieations might link to the same publie spelling eheeker and thesaurus library modules, while a graphies program links to a set of private graphies-effeets modules.

Inside the Power Macs

From the outside, the Power Maes look almost identieal to their Quadra eounterparts. Look elosely and you'll notice the word *PowerPC* on the ease, as well as the Quadra 605–like styling for the floppy drive panel. Internally, too, there are more similarities than differenees.

CPU The biggest differenee is the use of the PowerPC 601 CPU. Open the ease and you'll see a sieenee-fiction–like heat sink fanning out from the CPU (see the photos in "Hardware Differenees").

System memory The Power Maes all have 8MB of RAM soldered on the motherboard. You ean expand the memory with the same type of 72-pin SIMMs as used on Centris and Quadra models introduced last year. But unlike with the Quadras and Centrises, you need to add SIMMs two at a time, not one at a time. (The PowerPC 601 uses 64-bit addressing for memory, and one 72-pin SIMM has just 32 bits of addresses.) But unlike such Maes as the IIei, whieh had confusing rules about what kinds of SIMMs to put in whieh banks, a Power Mae requires only that the two SIMMs be in contiguous slots and that the two SIMMs be the same eapaeity and speed.

The 6100 has a maximum memory capacity of 72MB using hard-to-find 32MB SIMMs in both of its SIMM slots. The 7100 has four SIMM slots, for a maximum memory capacity of 136MB with 32MB SIMMs. Filling an 8100's eight SIMM slots with 32MB SIMMs gives it 264MB. If you don't need that much RAM, the Power Macs also work with 2MB, 4MB, 8MB, and 16MB SIMMs.

The 601's internal 32K primary RAM cache lets Apple use relatively slow 80ns RAM for the Power Macs' main system memory. Faster 70ns and 60ns SIMMs, which some Quadra and Centris models require, also work on the Power Macs but do not improve performance.

Cache For better memory subsystem performance, the Power Mac 8100 comes with a 256K secondary RAM cache on a 160-pin SIMM. On the 7100 and 6100, users can add a secondary cache by plugging in a 160-pin, 256K SIMM (not a standard RAM SIMM). On the 8100, you can replace the 256K SIMM with a 512K cache SIMM. The secondary cache does not approach the blistering transfer rates of the CPU's internal 32K primary cache (640MB per second for data and 2.5GB per second for instructions), but

Does PowerPC Beat Intel's Best CPUs?

You'd think that Intel's Pentium CPU is an overbloated, dead-end fire hazard, from the claims that Apple, Motorola, and IBM have made about the rival Intel CPU. The PowerPC represents the first generation of a new type of CPU that will move the Macintosh and some IBM PCs ever higher in performance at very low prices. By contrast, the three companies say, Intel's family of chips is at the end of its line, doomed to obsolescence soon.

Don't believe it for a minute.

It's true that the PowerPC is a great advancement over the previous CPUs in the Apple lineup. Motorola's 680X0 series has essentially hit the end of its life, which is why Apple dropped the 680X0 CPU and switched to IBM's Power architecture, from which the PowerPC was derived. Macworld Lab tests have consistently shown that even with Windows, a 486-based PC is faster than a comparable 040-based Mac. In low-level tests, an 040 CPU may beat out a 486, but most real-world tasks don't exercise a CPU in the same way.

Future Pentiums It's also true that the PowerPC is at the beginning of its life; and that fact, combined with its RISC design, gives it a lot of flexibility for future growth. The Pentium, however, has at least two more generations to come (one, dubbed the P6, is expected next year, and the P7, still under development, should follow a couple of years later), not counting a lower-power, lower-cost, 100MHz version dubbed the P54C, due out by June.

Contrary to the impressions that Motorola, IBM, and Apple are giving, the Pentium itself uses many of the RISC technologies that the PowerPC does, but it also contains all the circuitry needed to be completely compatible with the 80X86 line. That means you don't need to buy new software when you switch from 486 to Pentium, as you must when switching from 040 to PowerPC 601.

And the Pentium's problems of large size, power usage, and heat should be taken care of with the P54C. The Pentium's transistor circuits are 0.8 microns (millionths of an inch) wide. Multiply that by 3.1 million (the number of transistors in the CPU) and you can see what causes its large size and thus its power consumption and heat. The P54C version will use 0.6-micron circuits, which will make its size and power consumption roughly equal to that of a 486 or 040. The PowerPC 601, because it was designed after the Pentium, already used smaller (0.65-micron) circuits, so its 2.8 million transistors take just 41.4 percent of the Pentium's area. (The P6 and PowerPC 603 will use 0.5-micron circuits.)

For these reasons, you can expect the next several generations of the Pentium and PowerPC to trade the lead in terms of speed, size, and power consumption—especially when you factor in other system components, such as the system bus and video controller, that play a significant part in determining a computer's overall performance.

A Pentium-based PC (left) runs at 70 percent the speed of the top Power Mac (right).

The 486 isn't dead, either The 486 also has at least a couple more years of life in it, with the new IntelDX4 (486 is no longer part of the name) CPU that runs at 75MHz, 83MHz, and 100MHz internally on motherboards running at 25MHz, 33MHz, and 50MHz. (The first DX4 PCs are expected by summer.) A DX4 can be two, two and a half, or three times as fast as the motherboard, so 150MHz DX4s are possible, although 50MHz buses and the superfast RAM they require are expensive and difficult to manufacture today. (The PowerPCs run at twice the motherboard speed, so a 66MHz PowerPC works on a 33MHz motherboard. Intel's 486DX2 CPUs follow the same approach. Little known is that so do Motorola's 68040s, which work internally at twice their rated speed: a 33MHz 040 works at 66MHz internally.)

The DX4 has the added advantage of taking less power than previous 486 and 486DX2 CPUs (4 watts versus 6w), so the DX4 is designed to be used in notebooks as well as desktop computers. (Apple has said it will use the 3w PowerPC 603 for its notebooks, since the 601 takes 9w and an 040 takes 6w.) The DX4 also uses 3.3-volt circuitry, which means it has longer battery life than other CPUs that use 5V circuitry; similarly, the PowerPC 601 uses 3.6V circuits.

The DX4 marks the first time that notebooks can take advantage of the fastest CPUs that desktops can. It's too soon to know what performance Apple's PowerPC 603–based notebooks will have, since the 603 needs a large, power-consuming cache to have 601-like speed. At least, it's reasonable to expect both DX4

at 200MB per second, the secondary cache more than doubles the transfer rate between CPU and RAM or ROM. On a prototype Power Mac 7100/66, Macworld Lab saw a 14 percent difference with the optional cache installed for typical processing, and we saw 44 percent for floating-point operations, both with 680X0 programs. The additional throughput benefits the emulator and emulated 680X0 software more than native PowerPC software.

SCSI The SCSI port is compatible with the SCSI-2 protocol (but not the Fast or Wide protocols), and theoretically transfers data at 5MB per second. Under optimal conditions with Apple's internal drives, Macworld Lab measured transfer rates of 2.3MB to 2.6MB per second to and from the prototype Power Macs. The 8100 has a second SCSI channel with an internal connector; this channel is compatible with the SCSI-2 Fast protocol and transfers data at up to 10MB per second. Actual throughput depends on the speed of your SCSI devices and the quality and condition of your cables. Dual-channel SCSI lets the 8100 keep speed up on the internal channel even if the external channel gets bogged down

and 603 notebooks to be competitive in terms of performance.

PowerPC's long-term pros Despite the medium-term growth potential for Intel's CPUs, the PowerPC does have a better long-term advantage. Although the Pentium uses RISC technology to gain high speeds, it does get weighed down by the baggage of its backward compatibility with the 80X86 line (that's one reason the Pentium has more transistors than the 601). Although the Pentium has some superior implementations of RISC technology compared with the 601 (such as being able to handle integer calculations in its floating-point unit), its performance is about the same.

To stay even with a PowerPC, Intel has to use better technology in the Pentium than Motorola and IBM have to use in a PowerPC. If both CPUs were to use the same advanced techniques, the PowerPC should have an advantage. Plus the 60MHz PowerPC 601 costs less to make than a 60MHz Pentium or the 100MHz DX4, which helps Apple and other PowerPC adopters save money and better compete on price, or they can reinvest the savings in new technologies. Also, 66MHz and 80MHz 601s are now available, while few 66MHz Pentiums are—and no faster versions are (yet).

Performance where it counts But how do the CPU's abilities translate to the performance on your computer? Right now, the Pentium is fast when it is used in an optimized system, like a 60MHz Compaq Deskpro 5/60M. In Macworld Lab's standard tests, the Pentium-based machine was so fast that what takes 20 seconds on a 33MHz 040-based Quadra 650 takes less than half a second on the Pentium PC. Because the native PowerPC versions of these programs are not available, we can't use them to compare the PowerPC 601 with the Pentium, but by using other software, we found that the 60MHz Pentium is slightly slower than a 60MHz 601. (The 601's faster FPU accounts for much of the difference.)

Having an optimized system is key. Apple, because it controls the design of its hardware and doesn't need to worry about getting a product to market before a competitor, has long taken advantage of optimizing a system to get the most out of its components. That's how Apple narrowed the performance gap between the 030 and 386, and between the 040 and the 486. For PC users, it's different. The first Pentium-based PCs actually ran slower than their 486DX2 counterparts, since companies just put a Pentium inside a 486 system, without taking advantage of the Pentium's memory and instruction handling. Also, while optimized Pentium PCs do run existing Windows software faster, once developers recompile their applications for optimal Pentium performance, there should be another 10 percent boost. (And these recompiled versions will continue to work at current speeds on 80X86 systems.) Expect that to start happening by the end of the year.

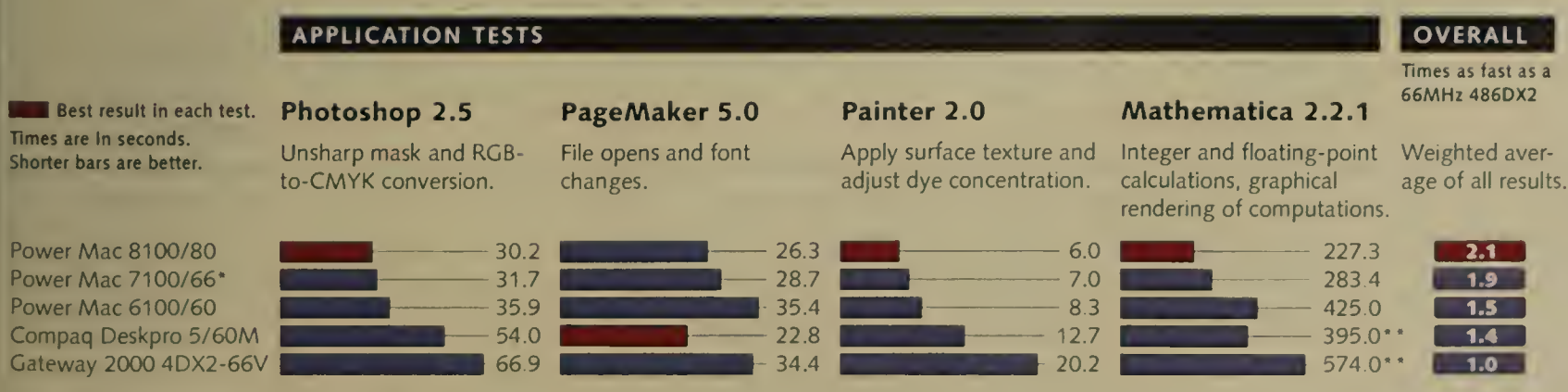
Behind all the hype over whose technology is better lies a welcome reality for customers: Apple's Macs at the least stay even with their PC competitors. And often, Macs will surpass PCs. Intel has been shaken by the PowerPC and has moved quickly to compete with it. That will keep PC customers happy as their systems get more powerful, and Apple will have to respond aggressively so it can keep Mac customers equally happy. If so, we all win.

BY GALEN GRUMAN

MW LAB

Who's Faster: Power Macs or Top PCs?

Macworld Lab compared Power Macs against Windows PCs using the top Intel CPUs: a 60MHz Pentium in a Compaq Deskpro 5/60M and a 66MHz 80486DX2 in a Gateway 2000 4DX2-66V. The Power Macs were prototypes. All systems had 16MB of RAM, and we ran them in 16-bit color (the PCs used a Diamond Computer Systems SpeedStar Pro video card). We used beta versions of native PowerPC software for the Power Macs and current versions of Windows software for the PCs. (When PowerPC software and the final Power Macs ship, Power Mac performance should be somewhat higher.)



*The Power Mac 7100/66 used a 256K cache card.

**Because of memory-handling errors that interfered with testing, this number is a composite of several tests; actual performance may differ by as much as 2 percent.

with slow external devices or poor cables.

Direct memory access In the Power Macs, data passes through the SCSI, serial, Ethernet, and sound ports directly to and from memory at high rates because a direct memory access (DMA) controller supervises the data transfer, relieving the CPU of this chore. The same controller chip provides DMA for the internal floppy drive port. DMA leaves the CPU free to perform other tasks uninterrupted, resulting in faster data transfer through the ports and faster processing of other tasks. Although the CPU and RAM controller may contend for access to RAM, causing one to have to wait for access, the CPU's large 32K internal cache reduces the likelihood of this conflict.

DMA works hand in glove with the Power Macs' ability to conduct asynchronous SCSI operations, keeping multiple SCSI devices busy simultaneously. While one SCSI device stores received data, for example, it can relinquish the SCSI bus so another device can send other previously requested data. Dantz Development's Retrospect 2.0 uses this technique to greatly improve backup performance by writing backup data to tape while reading more data to be backed up from disk. The operating system—specifically the portion known as SCSI Manager 4.3—enables asynchronous SCSI operations, but to realize its full potential, developers must update driver software for hard drives and other SCSI devices. Many device drivers have been upgraded and most others are in progress.

NuBus Apple says that the Power Macs' NuBus slots—there are three in the 7100 and 8100 and an optional 7-inch slot in the non-AV 6100—can transfer data two to four times as fast as other Macs except the 660AV and 840AV, thanks to a NuBus controller chip that Apple designed for the Power Macs. Theoretically, data-transfer rates can reach 40MB per second between a NuBus card and the CPU, and 80MB between NuBus cards. Apple says it has measured data transfers at 35MB per second from the CPU to a NuBus card, 20MB per second the other direction, and 80MB per second between NuBus cards.

The changeover from NuBus to the much faster PCI expansion slots, which some PCs already use and Apple has announced it will eventually adopt, appears to be 9 to 12 months away.

Sound The back-panel ports have more in common with an AV Mac than any other model. The sound-in and sound-out ports handle 16-bit stereo sound for speech recognition and compact-disc audio fidelity. None of the Power Macs include a microphone.

Communication Both the modem port and the printer port are high-speed GeoPorts, like the modem port in the 660AV and 840AV Macs. You can also connect a LocalTalk network or any serial device (like a fax modem) to either GeoPort.

Storage Internal storage space is the same on the Power Macs as on the equivalent Centris and Quadra Macs. The 6100 and 7100 have room for a floppy drive, a 3.5-inch third-height hard drive, and a 5.25-inch half-height device with removable media, such as a CD-ROM or SyQuest drive. The 8100 has space for the same devices plus space for one full-height or two half-height 3.5-inch drives (not accessible for removable media). Many of today's 1GB and larger drives are half-height and will fit in an 8100 but not in the third-height space in a 6100 or 7100. (You may be able to buy a bracket for installing a half-height 3.5-inch hard drive in the 5.25-inch drive bay on a 6100 or 7100. APS Technologies [816/483-6100] and Proline Distribution [415/461-2227], for example, sell such brackets for the Quadra 610 and 650.)

A CD-ROM bundle is also available, and it includes a new type of CD-ROM drive that does not use bothersome CD caddies. Instead, there's a built-in tray to hold the CD, as in a stereo CD player. With the CD-ROM configurations, you get a CD that works as a start-up disk and can install System 7 on a hard drive whose system has become corrupted. The CD bundle is standard equipment with a 250MB hard drive on a 6100 or a 500MB hard drive on a 7100, as well as on every AV Power Mac. The CD-ROM bundle is optional with a 160MB hard drive on a 6100, a 250MB hard drive on a 7100, and a 500MB hard drive on an 8100. Apple does not include a CD-ROM drive with a 250MB or a 1GB hard drive on an 8100, but you can buy one separately.

What's the Real Price?

At an estimated dealer price of $1750 for a base model 6100/60, Apple is making PowerPC performance inexpensive. For a few hundred dollars more than a Quadra 610, 650, or 800 (which Apple says it will discontinue when product demand disappears—that means soon), you can get a Mac with PowerPC 601 performance and all AV technologies except TV video.

But Apple's low street-price estimates for the Power Mac 6100 and 7100 assume that you will also buy an Apple Color Plus display (the medium-quality tridot monitor, not the high-quality, Trinitron-based Macintosh Color Display) and a standard Apple Keyboard II. The 8100's price estimates include the Trinitron monitor and Apple Extended Keyboard II. (Apple does not sell a monitor or a keyboard as part of the system; the company quotes a complete system cost so customers can more readily compare pricing with PC bundles.)

Chances are you'll want to spend a couple hundred dollars more on the keyboard and monitor than Apple has figured

Power Mac Options

	Apple's Estimated Base-Model Price [A]	CPU Speed	Base-Model RAM	Maximum RAM [B]	Base-Model Cache	Maximum Cache	NuBus Slots	Base-Model Hard-Drive Capacity	Hard-Drive Options (price [A])
Power Macintosh 6100/60	$1750	60MHz	8MB	72MB	none	256K	1 [D]	160MB	250MB ($1930 [E])
Power Macintosh 6100/60AV	$2500	60MHz	8MB	72MB	none	256K	0	250MB	none
Power Macintosh 7100/66	$2650	66MHz	8MB	136MB	none	256K	3	250MB	none
Power Macintosh 7100/66AV	$3450	66MHz	8MB	136MB	none	256K	3	250MB	500MB ($3070)
Power Macintosh 8100/80	$3950	80MHz	8MB	264MB	256K	512K	3	250MB	500MB ($4500 [E]), 1GB ($4830)
Power Macintosh 8100/80AV	$5250	80MHz	16MB	264MB	256K	512K	3	500MB	none

[A] Not including monitor or keyboard. [B] With 32MB SIMMs. [C] Using the bundled video card on non-AV Power Macs; using the bundled AV card on the AV Power Macs. drive as well. [F] 8-bit if AV card's TV ports are in use. [G] 8-bit with base configuration's 1MB of VRAM. [H] 16-bit with base configuration's 2MB of VRAM.

into its estimates—for example, you may want a 16-inch monitor. Other options—such as larger hard drives, CD-ROM drives, AV cards, and SoftWindows—will all cost extra, roughly $300 to $500 each. Then there's the price of cache and extra memory, although chances are you won't need to get much more memory, since all the models come with 8MB soldered onto the motherboard.

Apple claims that a Power Mac costs as much as a comparable Windows PC. Apple's claims are accurate, whether you buy a basic system or a fully loaded one. That's a real achievement.

The PowerPC in Your Future

Apple plans to move all Mac lines to PowerPC CPUs over the next couple of years. When you move to a Power Mac depends on the type of Mac you're buying and on the software you use.

Certainly you can rule out a Power Mac if you need a portable computer. The PowerPC 603 CPUs that Apple has said will be in future PowerBooks won't be shipping in volume until the third quarter of this year, according to Motorola, so it's reasonable to assume that portable Power Macs are probably 9 to 12 months away. The 603 uses less than one-third the power of a 601 and features three reduced-power sleep states ideal for portable computers. The 603 is compatible with the 601 but can perform at the same level only with a large 1MB cache on the motherboard, which may use as much power as the 603 saves and would increase system cost. Apple must solve the performance-power-cost equation before it can make a portable Power Mac.

You can also ignore Power Macintoshes if you need a home or entry-level business computer, since Power Macs designed for these needs will not be available for about a year, when the 604 CPU is available in large quantities. The 604 will be significantly faster than the 601, according to Motorola. When the 604 succeeds the 601 in midrange and high-end desktop Macs during 1995, the 601 or the 603 may show up in home and entry-level-business Macs. In the meantime, consider the Quadra 605, a Performa, or the Color Classic, which are cheap and fast enough.

The first Power Macs are midrange and high-end-business computers, essentially replacements for all the Quadras except the 605. The Power Macs are better hardware values and their performance with native PowerPC software is compelling. However, the Quadras today offer better performance and compatibility with 680X0 software overall than the Power Macs, and the Quadras can be upgraded to Power Macs (see "PowerPC Upgrade Strategies," in this issue). If you need that compatibility or performance in a new computer, buy a Quadra now (quickly, before they're gone), but be prepared to pay again when the time comes to upgrade to PowerPC. You'll have less reason to want a Quadra as more software becomes available in native PowerPC versions.

When the applications you could not bear to use at emulated speeds are available in native PowerPC versions, it'll be time to make your move to a Power Mac. It's not a question of if, but of when. After all, Apple is working hard to make sure there are no Macs except Power Macs. m

Maximum Color Depth Using RAM-Based Video for 14-Inch Monitor	Maximum Color Depth Using PDS-Based Video for 19-Inch Monitor [C]
16-bit	not available
16-bit	16-bit [F]
16-bit	16-bit [G]
16-bit	16-bit [F]
16-bit	24-bit [H]
16-bit	16-bit [F]

[D] Requires $99 PDS-to-NuBus adapter. [E] Includes CD-ROM

BEHIND OUR TESTS

MW LAB To test the new Power Macs, Macworld Lab used prototype models from Apple and our standard Business-Systems Tasks suite. These tests are based on running real-world tasks on shipping applications—Microsoft Excel 4.0 and Word 5.1a, Adobe Photoshop 2.0, and QuarkXPress 3.2 (we had to drop Aldus PageMaker 4.2 this time because it would not run on the Power Macs)—which meant that we were actually testing the performance of the Power Macs' 680X0 emulation. That's fair, since initially only a few native PowerPC programs will be available, and most of those will not be standard business-productivity programs. Results for Apple's upgrade boards for some Centris, Quadra, and II-series Macs are presented in the feature "PowerPC Upgrade Strategies," in this issue.

To gauge the long-term performance potential of the Power Macs, we tested 15 native applications provided to us in prerelease form, using a mix of real-world tasks for each program. We compared the native programs on a Power Mac 7100/66 with a 256K cache against their 680X0 versions on a Centris 650 and in emulation on the 7100/66. This shows not only the speedup you get by switching to PowerPC with native applications, but also the trade-offs you'll have to make when you have some programs running native and others in emulation. Those results are covered in the feature "Power Mac Software," in this issue.

Given Apple's strong push to make Macs Windows-compatible, we also measured the performance of Insignia Solutions' SoftWindows Windows emulator, which Apple has cited as the preferred method for making a Mac Windows-compatible. In addition to our standard Core-Performance Index tests, we benchmarked four representative Windows-only applications, since that's the whole reason for getting Windows running on a Mac. Those results also appear in "Power Mac Software."

One promise of the Power Macs is to surpass Windows PCs in terms of both price and performance, as the latest 040 Macs come close to doing. Using real-world tests with shipping Windows programs and beta versions of their Power Mac counterparts, we compared Windows PCs using today's fastest Intel CPUs against the Power Macs.

Note that the native PowerPC software was beta, which means performance is likely to be slower than in the shipping versions. The Power Macs were also prototypes, with a close-to-final version of the system software and hardware. We expect few system-level performance differences between the prototypes Apple loaned us and the final shipping versions. It is possible, however, that some of the few software incompatibilities we found will have been fixed.—**Macworld Lab testing supervised by Lauren Black and Danny Lee, with additional testing by Matthew Clark, Galen Gruman, Mark Hurlow, and Tim Warner**

LON POOLE is a *Macworld* contributing editor who regularly covers new Macintosh technology. GALEN GRUMAN is a *Macworld* senior associate features editor who closely follows PowerPC technology.

POWER MAC SOFTWARE

It always comes back to speed. That's the fundamental promise of the Power Macs. And that's what the first native PowerPC programs offer: lots and lots of speed—for the applications that can take advantage of it. While the Power Macintosh won't make most Microsoft Word users more productive, it will make a significant difference to users of Adobe Photoshop, QuarkXPress, ACI US 4D, or Aldus FreeHand, for example.

POWERPC NATIVE PROGRAMS WILL DELIVER PHENOMENAL PERFORMANCE, WHEN THEY ARRIVE

BY GALEN GRUMAN

Several types of programs will reap the benefits of PowerPC. One type includes programs that do constant or highly repetitive calculations, such as rendering, spreadsheet recalculation, and animation. Another type includes programs that do involved calculations, such as image editing and database sorting. Of course, PowerPC will also benefit power users of such programs as Word—those who have highly formatted documents, use extensive exception dictionaries with their spelling checkers, or replace text frequently in very large documents.

Macworld Lab looked at 15 programs still under development in early February and tested their speed against their 680X0 counterparts on a Centris 650 (which uses a 25MHz 608040 CPU that operates internally at 50MHz), as well as against their 680X0 counterparts running in emulation on a prototype Power Macintosh 7100/66 (which uses a 66MHz PowerPC 601 CPU). The 7100 also had a 256K cache card, which makes the machine about 10 percent faster than one without. The speedup is dramatic: func-



tions are accelerated so much that they take between one-fifth and one-half the time they take to run on a Centris 650.

For example, some Photoshop filters, such as Gaussian blur, take about one-third as much time on a 7100/66 as on a Centris 650; on average, Photoshop operations take less than half as much time on the 7100/66. Computations in Wolfram Research's Mathematica take a little more than one-fourth as much time, and font changes in Aldus PageMaker take only about a fifth as much time.

When you realize that a Centris 650 is two and a half times as fast as the Mac IIci, the mainstay of the Mac line just over a year ago, you'll see that Macintosh computing has entered a new plane. The benchmarks "Native PowerPC Software Performance" show the kind of performance you can expect. And keep in mind that we were testing prerelease versions; the shipping versions should be even faster.

But not all functions will see such dramatic speedup. At the extreme, a standard blur filter in Photoshop has almost the same speed on a 7100/66 as on a Centris 650. More often, these less-accelerated operations will take between half and four-fifths as much time on a 7100/66 as on a Centris 650—respectable but not dramatic improvements.

These varying amounts of speedup among operations in native PowerPC software usually derive from the type of computation the operation uses. For disk access and video display, the hardware limits the speedup, since the speed of the system bus and many other hardware components is about the same as on an equivalent Quadra. For processing, the PowerPC CPU does best with floating-point operations, which many programs don't use. The PowerPC also does best when it gets a steady stream of data and commands from a program, so programs that pause (perhaps because they are waiting for the hardware or for user input) won't see the maximum speedup.

Of course, to get the kind of speedup we saw, you will need to upgrade your current software to native PowerPC versions. Under 680X0 emulation on a Power Mac, your current software is likely to run slower than on a business-level Quadra or Centris. Macworld Lab tests show that the performance of a Power Mac 7100/66 running just 680X0 software ranges from slightly faster than a IIci to as fast as a Centris 650, with Centris 610–level performance being typical.

The variance in the speed of 680X0 software is caused mainly by the interplay between the programs and the Power Mac operating system. On a Power Mac, some components run in native PowerPC mode and others run in 680X0 emulation. A program operation that uses 680X0 components of the operating system will be slower than an operation that uses PowerPC components.

Focus on Speed, Not Innovation

While Apple has also positioned the PowerPC chip as a catalyst for whole new genres of functionality and interfaces, you won't see that for quite some time, since developers have had little time to discover what new capabilities the PowerPC will let them create.

Another factor is that developers—especially those that have huge customer bases, like Aldus, Adobe Systems, Microsoft, and WordPerfect—are largely unwilling to have different capabilities between, say, Windows and Macintosh users or 680X0 Mac and Power Mac users. Developers say they can't afford to shut off the millions of 680X0 Mac or Windows PC customers for the few hundred thousand likely first-year Power Mac buyers. None of the 43 companies we contacted has yet made plans to add new, PowerPC-specific capabilities.

Ironically, with the prices of Intel Pentium CPUs falling and the recent

introduction of the clock-tripled Intel-DX4 CPUs, Windows PCs will have power comparable to PowerPC-based Macs (see the sidebar "Does PowerPC Beat Intel's Best CPUs?" in "The Power Macintosh Arrives," in this issue). That means Apple's hoped-for speed advantage probably won't be dramatic, at least not initially. But it also means that developers will have sufficient power on Windows PCs to add the kinds of features that the Power Macs can take great advantage of—if there were a great mismatch, many developers would be tempted to simply leave the features out of both platforms.

PowerPC-Specific Features

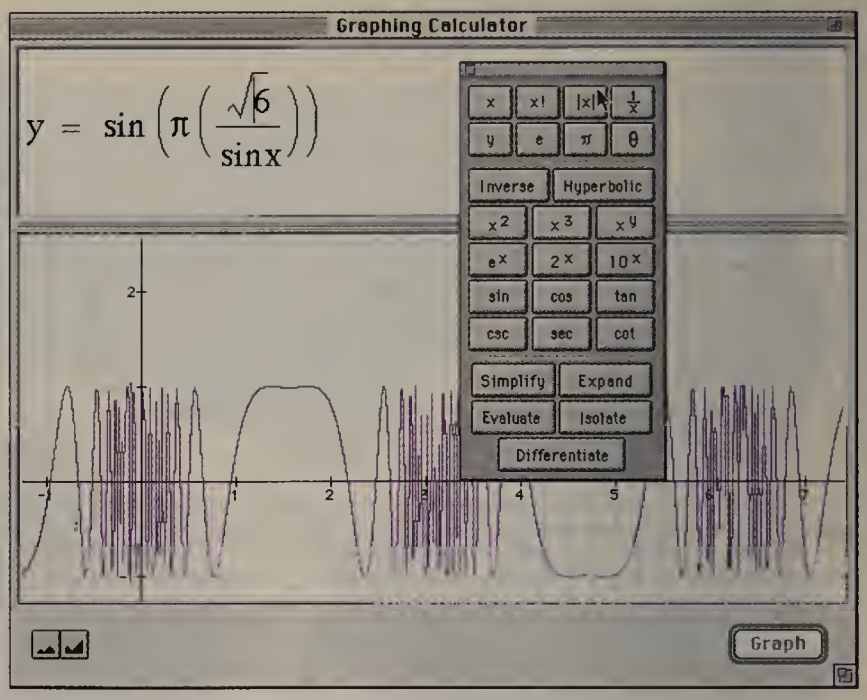
Although native PowerPC applications for now typically are identical to their 680X0 counterparts, you can get a taste of what PowerPC will let developers offer by looking at the Graphing Calculator utility that Apple bundles with the Power Macs. This is not the standard Mac Calculator (although that's bundled, too)—it's a full scientific-calculation device that even graphs the result as you enter a calculation (see the screen image, "Next-Generation Calculator"). This small program takes advantage of the PowerPC 601's fast floating-point unit (FPU) to speedily handle difficult calculations, such as sine and integrals. The 601's faster overall computation ability lets the calculator display the equation in WYSIWYG format as you enter it. And Graphing Calculator takes advantage of the native PowerPC version of QuickDraw to display and modify graphical views of that calculation at the same time. Think of how this could change the interfaces of everything from 3-D modeling to page layout to business charting to network diagramming, and you'll understand what PowerPC can do for software.

Some programs won't have PowerPC-specific features but will take advantage of the PowerPC to enhance features. For example, Gryphon Software Corporation's Morph 2.5 will have two pieces of code inside the software to handle the morphing: one for PowerPC and one for 680X0. The PowerPC piece is written specifically to use the PowerPC's fast FPU, so the software runs much faster. Similarly, Light Software is using the same dual-code technique to optimize encryption and decryption in its Light Protect, image filters in Light Paint, and compression in Light Compress.

Mixed Mac Universe

Apple has said very clearly that the 680X0 CPU is soon to be a thing of the Mac's past. Apple will continue to offer 040-based Macs in its consumer and portable lines for the next 9 to 12 months, since the low-power, lower-price PowerPC 603 CPU it plans to use in those models is not yet in production. But once the 603 is available in sufficient quantities, the 040, like the rest of the 680X0 line, is history.

Still, millions of 680X0 Macs are in use, including many 040-based systems that have enough processing power to be useful in business for several years. Thus, developers can't just drop 680X0 Macs from their plans. That means developers must find ways to offer versions for both types of Macs.



Next-Generation Calculator Apple's Graphing Calculator computes graphs and formats the equation as you enter it, and still this calculator is as fast as the standard Mac Calculator utility.

Developers are also faced with the dilemma of packaging two versions of software on retail shelves already bursting with products, so expect most applications to have both PowerPC and 680X0 versions in the same box.

Most will use a smart installer, which can extract a PowerPC version or a 680X0 version from the installation disks and install just the appropriate code on your Mac. A few companies—including Microsoft, Adobe Systems, Fractal Design, Now Software, Diehl Graphsoft, and National Instruments—recognize that many people need to install a product on two Macs (their office and home Macs, or their office and notebook Macs, for example) and thus let customers install two copies, with the restriction that only one copy may be run at a time.

Some smart installers give you the third option of installing a fat binary, a format that lets you run a program on either a Power Mac or a 680X0-based Mac—this is handy for people using external hard disks that move between, say, a Power Mac at the office and a Centris 610 at home, or for companies seeking to install just one version on all the Macs in its office.

None of the companies we surveyed planned to include two sets of disks (one for PowerPC and one for 680X0) in the box. Developers would like to use inexpensive CDs instead of floppies as their standard installation medium, but only about a third of the Macs in use today have CD-ROM drives. QuarkXPress 3.3 for Power Macs is an exception, since most of Quark's customers are power users who already own CD-ROM drives.

For programs that are not large, like many utilities, developers can just deliver a fat binary and not worry about smart installers or having two sets of install disks. The fat binaries do come with a price: as the name implies, they're larger than a standard program. Developers report sizes anywhere from 1.2 to 1.7 times as large as a standard program, with most in the 1.4 to 1.6 range.

But PowerPC code is usually bigger than 680X0 code (the processing efficiency in the PowerPC's RISC architecture is paid for by requiring more instructions in the code, thus the larger size)—about 1.2 times as large, developers say.

The actual code growth depends on the developer's coding practice. WordPerfect, for example, saw a lot of code growth because the 680X0 Mac version was written in assembly language, which is very compact but specific to a type of CPU. Because the PowerPC does not support assembly code, the rewritten WordPerfect had to be done in a less-compact language. In contrast, the PowerPC version of FrameMaker 4.0 is almost the same size as the 680X0 version, since the 680X0 version was actually a port from a version designed for Unix workstations based on IBM's Power CPU—the forebear of the PowerPC.

PowerPC Software Plans

By the end of the year, almost every major program should have a native PowerPC version. The table, "Native PowerPC Software Timetable," shows the planned availability of software from developers who have announced PowerPC efforts. If a product is not listed, its developer was

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Are Power Macs Good Windows PCs?

For years, Apple has criticized and poohpoohed Windows as a poor imitation at best. But it's clear that whatever its technical failings, Windows is the interface of choice for most PC users. So Apple has decided to make it easy for Windows users to buy Macs, basically selling them a Windows PC—and promising a good one, at that—and throwing the Mac in for free.

Apple is doing this mainly by promoting Insignia Solutions' SoftWindows, which runs Windows and DOS software via emulation in a window on the Power Mac and supports networks, printers, and other standard external PC devices. Apple will even bundle SoftWindows with all three Power Macs; to get it you'll pay an extra $565 for a 6100, $385 for a 7100, and $825 for an 8100. Apple also sells its Quadra 610, DOS Compatible, a 68040-based Mac that includes a 25MHz 486SX-based PC coprocessor card. (The card cannot be used in a Power Mac.)

Another hardware option is Orange Micro's OrangePC line of DOS coprocessor cards, which work in any NuBus-based Mac (both 680X0 and PowerPC) except the Centris and Quadra 610. A new model, due in March, uses a 66MHz 486DX2 CPU. Macworld Lab tests on a prototype show that this board performs like a 33MHz 486DX-based PC, since Windows can't take advantage of video and drive acceleration on the OrangePC card as it can on a PC.

Even the 040 Macs didn't have the horsepower to run Windows in emulation on the Mac, as users of Insignia Solutions' earlier SoftPC can attest. But the PowerPC Macs do. Macworld Lab tests show that SoftWindows on a Power Mac 7100/66 with a 256K cache card is about as fast as a 25MHz Intel 486SX-based or 40MHz Cyrix 386-based Windows PC. In Mac terms, its performance falls between a IIci and a Quadra 605. This is the same performance that the 7100/66 offers for 680X0 software.

In SoftWindows, calculation- and disk-based functions, such as find and replace and file loading, are fairly speedy, while video-based functions such as scrolling are fairly slow. For example, a Lotus 1-2-3 calculation takes six times as long with SoftWindows as it does on a 33MHz 486DX-based PC, a 1-2-3 scroll takes eight times as long, and a file open in Aldus InfoPublisher takes just twice as long. The video slowdown is caused by the many translations involved in interpreting Windows GDI (the Windows equivalent of QuickDraw) commands into the Mac's QuickDraw commands.

SoftWindows gained its speed boost not just from running on a faster CPU but by changing its underlying architecture. SoftPC emulated an Intel 80286 CPU, essentially making the Mac simulate a 286 and then running PC software in that simulation. SoftWindows uses the actual Microsoft Windows 3.1 code and translates its Intel-specific commands into PowerPC-specific commands. This faster on-the-fly translation is similar to the Power Macs' method for handling 680X0 software.

SoftWindows clearly offers Macintosh users a basic Windows business system's capabilities right on their Macs. Note, however, that to run SoftWindows, you need 16MB of system RAM on the Mac and need to set aside enough hard disk space for your Windows programs and data—60MB to 120MB would be reasonable to run three to six Windows programs. The cost of this disk space and RAM makes the real price for adding Windows more like $1000 (about $250 for a 170MB hard drive, $250 for 8MB of RAM, and $500 for SoftWindows) and $385 to $825 if you buy Apple's bundle—but that is still less than the $1500 cost of buying a separate 486SX PC. Plus, it's much more convenient than having two computers.

SoftWindows is based on the Windows Standard mode, which was designed for 286 compatibility. Most Windows users now own PCs based on 386 or 486 CPUs, and these CPUs have special circuits that improve memory handling, increase computation speed, and let multiple applications work simultaneously while minimizing the potential for system crashes. Programs written for Windows 386 Enhanced mode can take advantage of these features, while programs that support only Standard mode cannot.

Until recently, this was not a problem for SoftWindows, since few programs required that Windows be in 386 Enhanced mode. But that's rapidly changing; already WordPerfect 6.0 and FrameMaker 4.0 require 386 Enhanced mode. To address this need, Insignia plans to have a new version of SoftWindows later this year that supports 386 Enhanced mode. It may also add support for the popular SoundBlaster audio boards, which would give users full access to Windows multimedia.

BY GALEN GRUMAN

How SoftWindows Stacks Up

We compared Insignia Solutions' SoftWindows 1.0 and an earlier version (SoftPC 3.1) against Orange Micro's DOS coprocessor card and several Windows PCs using *Macworld*'s Core-Performance Index tests plus four programs available only on Windows. All systems had 16MB of RAM and ran in 8-bit color. (The PCs' performance benefited from inexpensive accelerated SCSI and video cards.)

Best result in each test. Products are arranged in decreasing order of overall performance.

	MACINTOSH CORE-PERFORMANCE INDEX	WINDOWS-APPLICATION INDEX			
	Times as fast as a Classic. (Classic = 1.0)	Times as fast as a 33MHz 486DX PC. (33MHz 486DX PC = 1.0)			
	Microsoft Excel and Word	**Lotus Ami Pro 3.01**	**Lotus 1-2-3 4.01**	**Microsoft Access 1.1**	**Aldus InfoPublisher 2.0**
	A series of business tasks that test processor, video-display, and disk-access operations.	Find and replace, layout reformat, and file-format conversion.	Integer and floating-point calculations, file-opens, and scrolls.	Report generation, file-format translation, and data sort.	Source-database conversions and data sorts
Compaq Deskpro 5/60M (60MHz Pentium)	31.2	2.0	1.5	1.9	2.4
Gateway 2000 4DX2-66V (66MHz 486DX2)	22.6	1.7	1.4	1.3	1.6
Orange Micro OrangePC 290* (66MHz 486DX2)	13.2	1.1	0.6	0.7	1.2
AMI 486/33 (33MHz 486DX)	13.2	1.0	1.0	1.0	1.0
Power Mac 7100/66 with SoftWindows 1.0*	5.4	0.3	0.2	0.2	0.4
Centris 650 with SoftPC 3.1	1.6	0.1	0.1	0.1	0.1

**Software and hardware were prototypes. The Power Mac 7100/66 used a 256K cache card.*

Native PowerPC Software Timetable

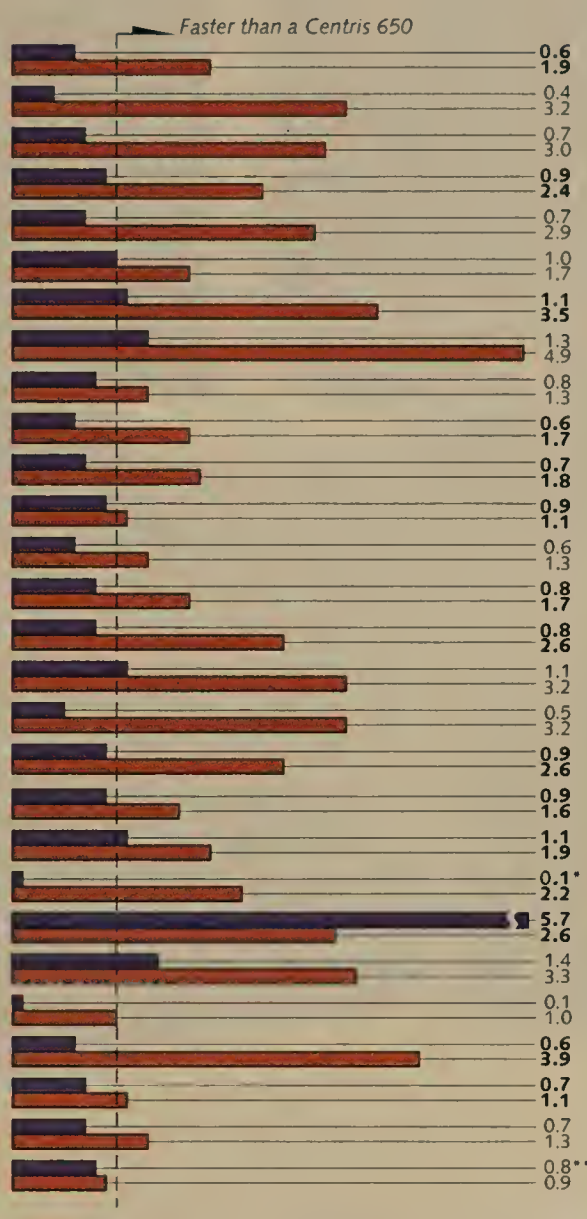
Company	Product	List Price/ Predicted Availability	Upgrade Price from Current/Previous 680X0 Version	Format [1]	Phone	Toll-Free Phone
Abacus Concepts	StatView 4	$595/by Oct.	TBA/TBA	TBA	510/540-1949	800/666-7828
ACI US	4D Server 2.0	TBA/by July	TBA/TBA	TBA	408/252-4444	800/384-0010
Adobe Systems	Acrobat Exchange	$195/by Jan.	TBA/TBA	smart install [2]	415/961-4400	800/833-6687
	Dimensions	$199/by Oct.	TBA/TBA	smart install [2]		
	Illustrator	$595/by July	TBA/TBA	smart install [2]		
	Photoshop	$895/by Oct. [3]	TBA/TBA	smart install [2]		
	Premiere	$695/by July	TBA/TBA	smart install [2]		
	Type Manager	$99/by Oct.	TBA/TBA	smart install [2]		
Aladdin Systems	StuffIt Lite	$25/by July	TBA/TBA	fat binary	408/761-6200	none
	StuffIt SpaceSaver	$59.95/by July	TBA/TBA	fat binary		
Aldus	FreeHand 4.0	$595/by June	TBA/TBA	PowerPC	206/622-5500	none
	PageMaker 5.0	$895/by June	TBA/TBA	PowerPC	206/622-5500	none
Alias Research	Alias Sketch 2.0	$995/by July	TBA/TBA	smart install	416/362-9181	800/447-2542
Apple Computer	PhotoFlash 1.1	$279/now	NA [4]/$49	fat binary	408/996-1010	none
autodessys	formZ 2.5	$1495/now	$65/$190	PowerPC	614/488-8828	none
Canto Software	Cirrus 2.0	$395/by May	TBA/TBA	fat binary	415/431-6871	800/332-2686
	Cumulus 1.2	$295/now	TBA/TBA	fat binary		
Central Point Software	MacTools 3.0	TBA/now	TBA/TBA	PowerPC	503/690-8090	800/937-9842
Claris	ClarisWorks 2.1	$299/now	TBA/$99	smart install	408/727-8227	800/325-2747
Connectix	RAM Doubler 1.0	$99/by Oct.	TBA/NA	fat binary	415/571-5100	800/950-5880
Dantz Development	Retrospect Remote	$449/May	$19.95/NA	smart install	510/253-3000	800/225-4880
	Retrospect	$249/May	$20/NA	smart install		
Dayna Communications	ProFiles 1.0	$129/April	free/free	PowerPC	801/269-7200	800/531-0600
DeltaPoint	DeltaGraph Pro 3.0	$195/by April	$29.95/$80	smart install [2]	408/648-4000	none
Diehl Graphsoft	MiniCad 5.0	$795/now	$150/free	fat binary	410/290-5114	800/455-0888
Electric Image	Electric Image 2.0	TBA/by Oct.	TBA/TBA	PowerPC	818/577-1627	none
Fractal Design	Dabbler 1.0	$99/now	free/NA	smart install	408/688-8800	800/297-2665
	Painter 2.0b	$399/now	$15/$79	smart install		
	Painter X2 1.0	$149/now	$15/NA	smart install		
Frame Technology	FrameMaker 4.0.2	$895/by May	TBA/TBA	TBA	408/433-3311	800/843-7263
Graphisoft	ArchiCAD 4.5	$4450/April	free/free	PowerPC	415/737-8665	none
Great Plains Software	Dynamics 2.0	[5]/by July	[5]/[5]	TBA	701/281-0550	800/456-0025
Gryphon Software	Morph 2.5	$239/now	NA [4]/TBA	fat binary	619/536-8815	800/795-0981
Hi Resolution	MacVisa	TBA/now	NA [4]/NA	TBA	none	800/455-0888
HSC Software	Kai's Power Tools	$199/by July	$79/$79	fat binary	310/392-8441	none
Insignia Solutions	SoftWindows 1.0	$499/now	NA [4]/TBA	PowerPC	415/694-7600	800/848-7677
Intercon	TCP/Connect II 1.2.1	$495/now	TBA/TBA	PowerPC	703/709-5500	800/468-3726
Itedo Software	IsoDraw 3.0	$2700/now	$100/$100	PowerPC	313/995-2200	none
Knowledge Revolution	Working Model 1.0	$995/by Oct.	TBA/TBA	PowerPC	415/553-8153	800/766-6615
Language Engineering	LogoVista E to J	$1995/now	TBA/TBA	smart install	617/489-4000	none
Light Software	Light Compress 1.0	$49/May	NA/NA	fat binary	408/253-4277	none
	Light Paint 1.0	$79/May	NA/NA	fat binary		
	Light Protect 1.0	$49/May	NA/NA	fat binary		
Macromedia	MacroModel 1.5	$1495/now	$49/$149	smart install	415/252-2000	800/288-4797
Microsoft	Excel 5.0	$495/by July	free/$129	smart install	none	800/426-9400
	Word 6.0	$495/by July	free/$129	smart install		
National Instruments	HiQ 2.1	$695/April	NA [4]/$195	smart install [2]	512/794-0100	800/433-3488
	LabView 3.1	$1995/by Oct.	$495/$495	smart install		
Neon Software	LANsurveyor 1.1	$395/April	NA [4]/free	smart install [2]	510/283-0771	800/334-6366
	NetMinder Ethernet 3.1	$695/by May	NA [4]/$50	smart install		
Nisus Software	Writer 4.0	TBA/by May	TBA/TBA	TBA	619/481-1477	800/922-2993
Now Software	Contact 1.1	$99/now	$19.95/$19.95	smart install	503/274-2800	none
Quark	QuarkXPress 3.3	$995/by July	$195/$195	PowerPC	303/344-3491	800/788-7835
Ray Dream	Ray Dream Designer 3.0	$349/by July	S&H/$99	TBA	415/960-0768	none
Specular International	Infini-D 2.6	$695/now	TBA/TBA	smart install	413/253-3100	none
VideoFusion	QuickFlix 1.1	$149/by June	S&H/S&H	fat binary	419/891-1090	800/638-1090
	VideoFusion 1.6	$649/by June	$29/$29	fat binary		
Wolfram Research	Mathematica 2.3	TBA/by May	TBA/TBA	TBA	217/398-0700	800/441-6284
WordPerfect	WordPerfect 3.0	$495/now	$24.95/$59.95	fat binary	801/225-5000	800/451-5151
Zedcor	FutureBasic	$299/by Jan.	TBA/TBA	PowerPC	602/881-8101	800/482-4567

TBA = to be announced; NA = not applicable; S&H = cost of shipping and handling, usually less than $25. [1] *Smart install allows installation of 680X0 or PowerPC versions from one set of install disks; fat binary lets the program work on both 680X0 and PowerPC Macs; PowerPC means that the PowerPC version is packaged separately from the 680X0 version.* [2] *Also supports installation of a fat binary for use in both 680X0 and PowerPC Macs.* [3] *Adobe will provide native PowerPC versions of its Photoshop filters in March; they are available free from online services or for $10 from Adobe.* [4] *PowerPC version is a revision to the previous 680X0 version.* [5] *Varies by module.*

Native PowerPC Software Performance

Results are based on tests with a prototype Power Mac 7100/66 with a 256K cache, using beta versions of native PowerPC software. For each program, we tested several typical tasks. For tasks that were exceptionally fast or slow, we have called out individual results. Products are arranged alphabetically by company name.

Current version (running in 680X0 emulation).
PowerPC beta version.
Bars represent times as fast as 680X0 software running on a Centris 650 (Centris 650 = 1.0).
Longer bars are better.



*Requires use of SoftwareFPU utility to emulate a 68882 FPU; this accounts for most of the slowdown.
**Requires use of SoftwareFPU utility for conversion filters to work, although performance is unaffected.

not ready to announce PowerPC plans, but it's safe to assume that popular business and graphics programs will have a PowerPC version at some point. The table also lists expected upgrade prices.

It may be surprising that major Mac programs like Microsoft Word and Excel, Adobe Photoshop, and Claris FileMaker Pro won't be ready soon after the Power Macs begin shipping, while smaller players like WordPerfect, Fractal Design Painter, Frame Technology FrameMaker, and Wolfram Research Mathematica will be available.

For major applications, developers give two primary reasons. One is simply that the programs are massive, and developers can't change or port them quickly. Thus, Microsoft and Adobe decided to wait until they release new versions of their programs to port the code to PowerPC. Developers also typically try to use the same core set of code for cross-platform applications, and the release schedules for such programs are usually independent of actions by any one hardware company.

Smaller Mac developers are often more flexible and seek ways of breaking into markets dominated by the larger developers. Thus, WordPerfect saw the opportunity to make inroads into the Word-dominated word processing market by offering a PowerPC version of WordPerfect 3.0 before Microsoft releases Word 6.0 for PowerPC. The customers of a second type of developer—like Frame or Wolfram—have specialized needs for which speedup is important, and so they demand improvement more frequently than, say, a spreadsheet user.

When to Buy In

To decide when to get a Power Mac, look at the performance of your current software under emulation (see "Native PowerPC Software Performance") and then check the planned availability dates for the PowerPC versions. When your critical software is available in native form—and assuming the slowdown on your other 680X0 software is acceptable—you'll know it's time to jump up to the Power Macs.

For graphic artists or serious desktop publishers, a Power Macintosh upgrade makes sense this fall, since most major applications should be ported by then. Computer-aided designers and technical publishers will not have to wait that long, since much of the software that they rely on will be available in PowerPC versions this spring.

If your work is done mainly in business programs like Excel, Word, Aldus Persuasion, or FileMaker Pro, there are fewer benefits if you upgrade soon, especially if you already use an 040 Mac.

The Best Is Yet to Come

As developers buy their own Power Macs and as the development tools they need to write PowerPC software become widely available, expect to see ever more PowerPC programs. At some point (probably in the next 18 months), developers will start orphaning the 680X0-based Macs and offering unique PowerPC features that are not feasible on earlier Macs or PCs. Expert assistance while you work, 3-D interfaces, graphical status indicators, videoconferencing, integrated fax and voice mail, and dynamic data exchange and cooperation among multiple active programs—these are what the PowerPC will let Mac developers offer to all business-level customers, not just the highest-end users.

Speed is fine, but that's just half the battle. Using speed effectively to make work easier and better suited to your needs and style—that's the ultimate promise of Power Mac software. Computer companies have long claimed that such software was just around the corner. Today, it actually seems to be in sight. m

GALEN GRUMAN is a *Macworld* senior associate features editor who focuses on PowerPC. He also edits *Macworld*'s *PowerPC News* section

Research assistance by MATTHEW HAWN

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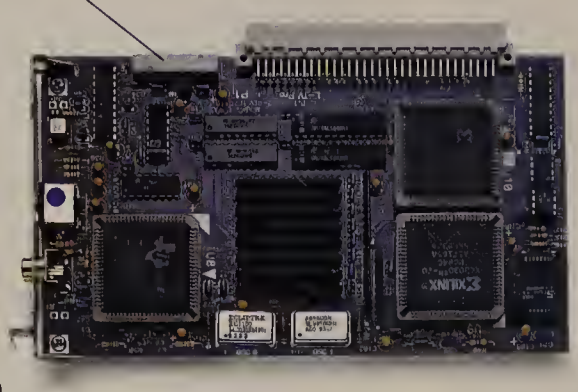
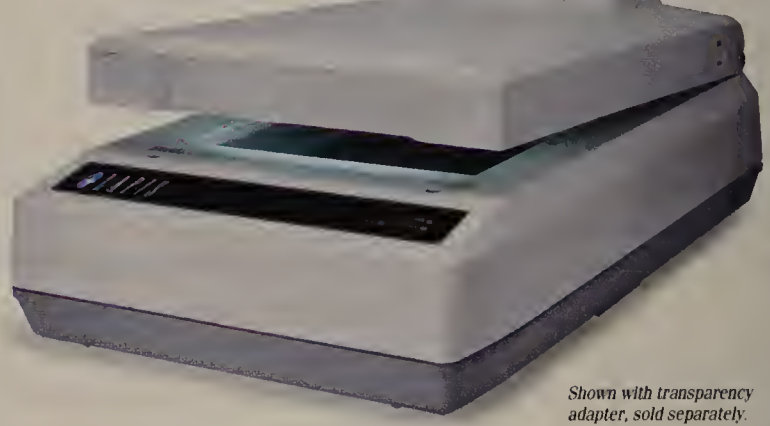


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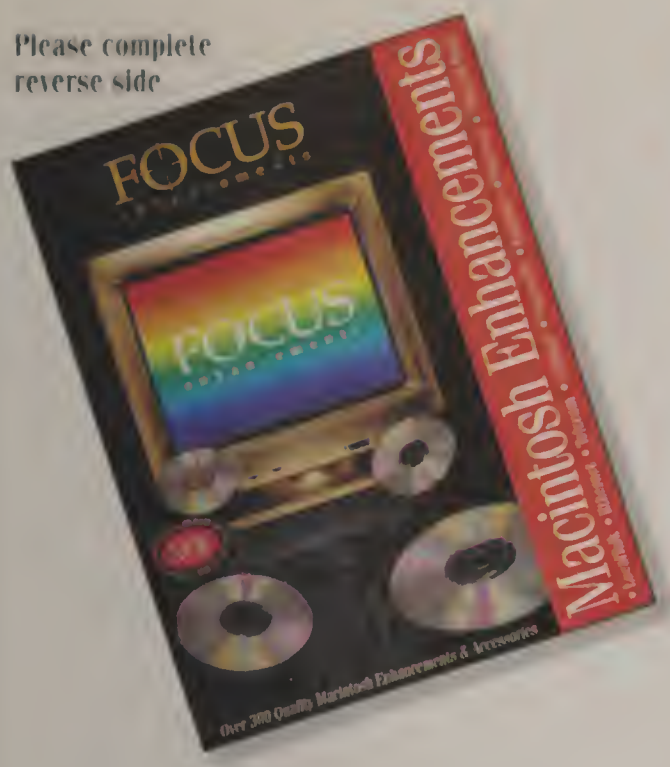
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PowerPC UPGRADE STRATEGIES

Longing to cash in on Power Macintosh speed, but find yourself a little short on the green stuff to make it a reality? Three hardware upgrade options that should be available at the same time as the new Power Macs will enable many older Macs with 68040 CPUs (as well as the 030-based IIvi and IIvx) to use PowerPC 601 CPUs and run Power Mac software.

AFFORDABLE POWERPC OPTIONS CAN TURN YOUR 68040 MACINTOSH INTO A POWER MACINTOSH

BY LON POOLE

A replacement motherboard from Apple works in all older Macs that have the same cases as the new Power Macs. The other two upgrade options, one from Apple and one that should be available from DayStar Digital, will work in Macs that have a 68040 CPU and an 040 PDS slot; the DayStar upgrade also requires a NuBus slot. Other upgrades are in the works. To see at a glance if your Mac can use one of the upgrades available now and to check for upgrade features, see the table "Power Mac Upgrade Essentials."

An older Mac whose case is similar to one of the Power Mac models (the Quadra and Centris 610, 650, 660AV, 800, and 840AV models, as well as the IIvi, IIvx, and Performa 600) can become a true Power Mac for about half the cost of the new computer—from about $1000 to $2000, depending on the Power Mac model. Any of those older Macs can acquire a Power Mac AV motherboard (at a higher cost, which had not been set at press time) with the audio and video capabilities of a Quadra 840AV. An Apple dealer performs the transformation by replacing the Mac's motherboard and back panel. You also get all the software

that comes with a Power Mac computer, including System 7.1.2, QuickTime 1.6.2, Macintosh PC Exchange, AppleScript, and Express Modem.

This motherboard upgrade makes economic sense if you need a full-featured Power Mac but want to protect your investment in a high-quality hard drive, and you need a CD-ROM drive and keyboard.

If you're looking to save even more money, consider Apple's user-installed Power Macintosh Upgrade Card, which should sell for about $700. Such cards will work in all Quadra and Centris models with a PDS slot (except the Quadra 605, which uses an LC III–style PDS slot). Working in conjunction with the host Mac's motherboard, the upgrade card makes it possible to run PowerPC native software on the older Macs.

While Apple's Power Mac upgrade card appeals to people on a tight budget, it also suits those who need a reversible upgrade, ensuring full 68040 performance and compatibility with 680X0 software (including the driver and ROM software of NuBus cards). While the upgrade card can run 680X0 applications in emulation, this can cause a significant slowdown in performance. Alternately, many users will take advantage of the option of shutting off the upgrade card (without removing it), restarting the Mac, and enjoying true—and faster—68040 on the motherboard for running 680X0 applications.

The upgrade card comes with its costs, however: you lose the option of Power Mac AV features, including 16-bit sound, speech recognition, and GeoPort—critical elements of future Mac computing. If you're torn about which upgrade fits your needs, read on.

Motherboard Upgrades

The replacement motherboard is identical to the motherboard in the equivalent Power Mac, from the CPU to the ports (as described in the feature "The Power Macintosh Arrives," in this issue). The model number (6100/60, 7100/66, or 8100/80) reveals the speed at which the PowerPC 601 CPU operates: 60MHz, 66MHz, or 80MHz. The Power Mac motherboard has 8MB of RAM soldered to it, a 4MB bonus for 610 and 660AV upgrades. Also, all the RAM SIMMs from a Centris or Quadra (but not a IIvi, IIvx, or Performa 600) can be moved to a Power Mac motherboard.

The 6100 has one slot for internal expansion, and with an adapter it accepts either a PDS card or a 7-inch NuBus card. The 7100 and 8100 accept one PDS card and three NuBus cards. PDS cards made for a 68030 or 68040 PDS slot do not work in the PowerPC 601 PDS slot, but most NuBus cards worked in Macworld Lab trials with prototype Power Macs. The few problems—notably video acceleration—appear to be software related. (For NuBus compatibility details, see "The Power Macintosh Arrives.")

Each Power Mac motherboard has a complete set of Power Mac ports and direct memory access (DMA) from the EtherTalk, sound, SCSI, and serial ports. These ports provide access to many audiovisual functions once unique to the 660AV and 840AV Macs—16-bit stereo audio, speech recognition, and GeoPort telephony. The AV display port drives an AudioVision display, or with an adapter cable, any ordinary 12- to 16-inch Mac monitor or 13-inch VGA monitor. The 6100 upgrade includes that monitor adapter cable; the 7100 and 8100 upgrades include a VRAM video card whose standard video port attaches directly to a 12- to 21-inch Mac monitor or, with an adapter, 13-inch VGA monitor. All three Power Mac upgrade packages are also available with TV-video input and output ports on a plug-in card, the Power Mac AV card (price not available at press time). Besides TV video ports, the AV card has a standard Mac video port just like the VRAM video card it replaces on the 7100 and 8100. By using both the motherboard's AV display port and the AV or VRAM card's Mac video port you can connect two monitors simultaneously.

The new back panel accommodates the ports on the AV card or VRAM card as well as the ports on the Power Mac motherboard. A separate internal CD-ROM upgrade includes a replacement front panel and the new tray-loading CD-ROM drive (price not available at press time). To take full advantage of PowerPC performance, plan on replacing your internal hard drive if it's smaller than 230MB (160MB for a 6100/60).

Apple estimates that street prices will be about $1000 to $2000 for motherboard upgrades, with the 6100/60 at the low end of the range, the 7100/66 in the middle, and the 8100/80 at the high end. At press time, Apple had no price estimates on the AV motherboard upgrades.

Power Macintosh Upgrade Card

The PowerPC 601 CPU on the Power Macintosh Upgrade Card runs at twice the speed of the 68040 on the motherboard using a technique called clock doubling. Thus the PowerPC 601 runs at 50MHz on a Centris 650 or a Quadra 610, 700, or 900; and at 66MHz on a Quadra 650, 800, or 950. The card runs at 40MHz on a Centris 610, which calls into question the value of the Centris 610 card upgrade; the 610 requires a PDS



Power Mac Upgrade Essentials

Company, Phone	Product	Estimated Street Price	Macs That Can Use Upgrade	Speed	On-Board RAM	Cache	Includes Power Mac Features [A]
Motherboard Upgrades							
Apple Computer, 408/996-1010	6100/60	$1000	Q660AV, C610, Q610	60MHz	8MB–72MB	optional	yes
	6100/60AV	[B]	Q660AV, C610, Q610	60MHz	8MB–72MB	optional	yes
	7100/66	$1500	C650, Q650, IIvi, IIvx, P600	66MHz	8MB–136MB	optional	yes
	7100/66AV	[B]	C650, Q650, IIvi, IIvx, P600	66MHz	8MB–136MB	optional	yes
	B100/B0	$2000	QB40AV, Q800	B0MHz	8MB–264MB	256K	yes
	B100/B0AV	[B]	QB40AV, QB00	80MHz	8MB–264MB	256K	yes
Upgrade Cards							
Apple Computer, 408/996-1010	Power Macintosh Upgrade Card	$700	Q950, Q900, QB00, Q700, Q650, C650, Q610, C610	40MHz, 50MHz, or 66MHz [D]	0MB [C]	1MB	no
DayStar Digital B00/962-2077	PowerPro 601	$1200–$1700 [E]	Q950, Q900, QB00, Q700,Q650, C650	66MHz or B0MHz	0MB–128MB [C]	undetermined	no

Q = Quadra, C = Centris, P = Performa. [A] *16-bit sound, speech recognition, GeoPort, DMA.* [B] *Price not available at press time.* [C] *Uses host RAM in addition to on-board RAM, if any.* [D] *Twice the host speed.* [E] *Depending on speed and configuration.*

adapter to install the card, raising the total price to about $800. For only $1000, you could buy a motherboard upgrade with all Power Mac AV features included.

The upgrade card has no RAM of its own; it uses the RAM on the motherboard (8MB minimum). Although the PowerPC 601 can access RAM across a 64-bit data path, the motherboard has only a 32-bit data path to RAM. The mismatch creates a performance bottleneck for the 601, which Apple has diminished with a whopping 1MB secondary RAM cache on the upgrade card (see "How Fast Does Apple's Upgrade Card Emulate 680X0?"). The PowerPC 601 accesses the 4MB Power Mac ROM on the upgrade card over a 64-bit data path, just as on a Power Mac motherboard.

The Apple upgrade card has no slots or ports, nor does it have circuitry to support them. It works with the NuBus slots, the back-panel ports, the built-in video, and the I/O circuitry on the motherboard. One NuBus slot is not usable because the upgrade card sits behind it in the PDS slot. (A Centris or Quadra 610 has no NuBus slot available when the upgrade card occupies the one expansion slot.)

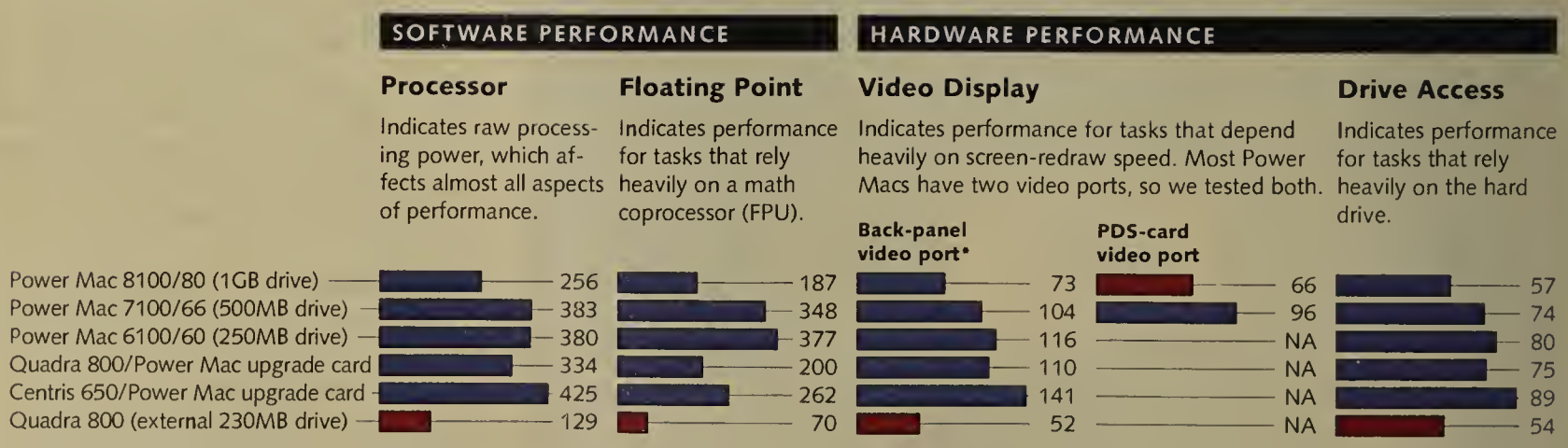
Macworld Lab tests compare a prototype Apple upgrade card running at 66MHz in a Quadra 800 with a prototype Power Mac 7100/66 running at the same speed. With emulated 680X0 software the upgrade card achieved about the same speed as the 7100/66 in video and drive tasks. Surprisingly, the upgrade card narrowly beat the 7100/66 in the processor tasks and performed floating-point tasks in slightly more than half the time it took the 7100/66. Apple attributes the differences to the 1MB static RAM cache on the upgrade card.

With the upgrade card turned off, the Quadra 800 motherboard ran the 680X0

MW LAB How Fast Does Apple's Upgrade Card Emulate 680X0?

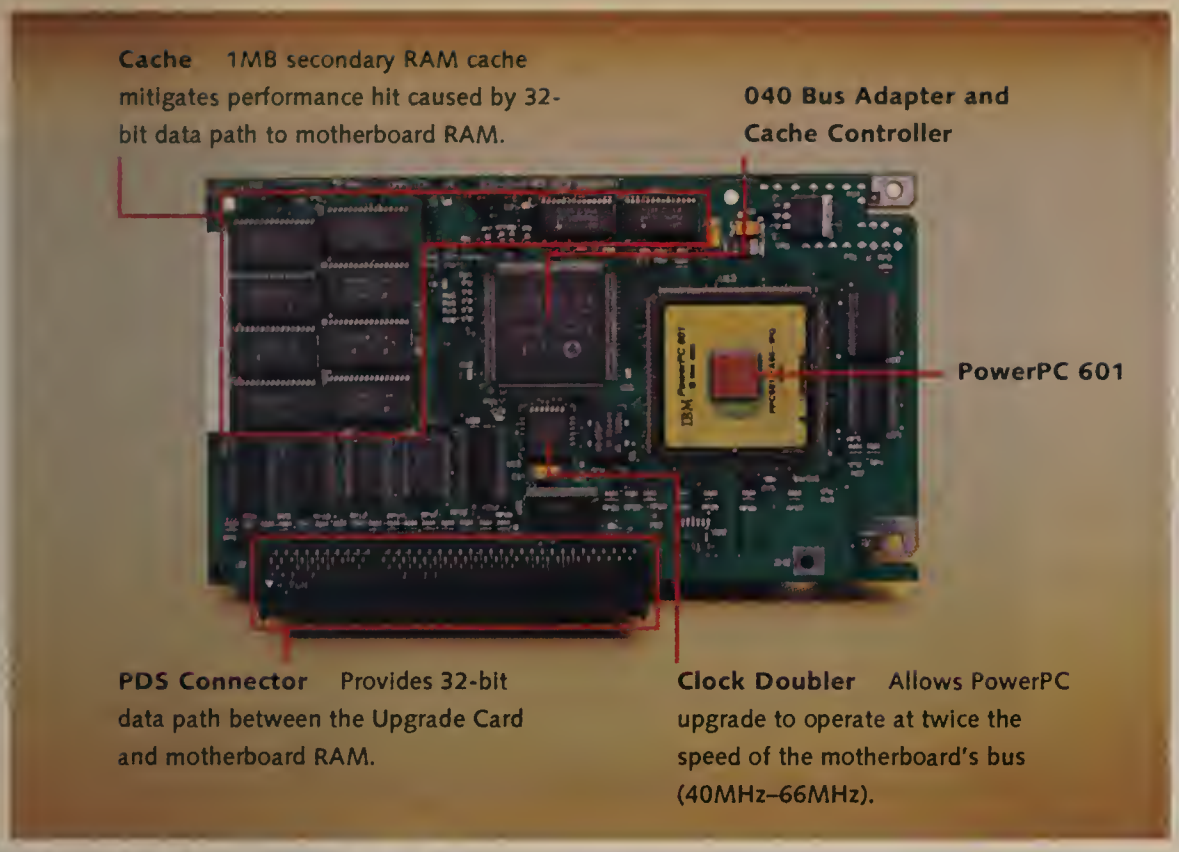
Best result in each test.
Times are in seconds.
Shorter bars are better.

These results reflect the performance of 680X0 software under emulation on a Power Mac. Macworld Lab tested prototype Power Macs, so actual performance may differ slightly. Native PowerPC software should be much faster (see "Power Mac Software," in this issue).



TESTING NOTES: The floating-point tests were conducted without Specular International's Infini-D, since it requires a 680X0 FPU not emulated on a Power Mac. The video tests show performance for typical business programs under 680X0 emulation. According to tests with beta native PowerPC versions of graphics software, a Power Mac's back-panel video should be 15 percent faster than a comparable Quadra's, while a Power Mac's AV-card video should be about 20 percent slower.

*NA = PDS-card video not available for these Macs. *On Power Macs, this is RAM-based video; on other Macs, it is VRAM-based.*



The Power Macintosh Upgrade Card No PlainTalk, GeoPort, or 16-bit sound.

software tests (of course, in native 680X0 mode) in about one-third the time it took to run those tests in emulated mode with the upgrade card. The Quadra 800 ran the video tests in about half the time, and the drive tests in slightly more than two-thirds the time it took the same machine using an upgrade card. The message is clear: the upgrade card is not much good in emulating 680X0 software.

In Macworld Lab tests with prerelease, native PowerPC versions of Adobe Photoshop, Aldus PageMaker, Wolfram Research's Mathematica, and Fractal Design Painter, however, the upgrade card did much better. A Centris 650 running the Apple upgrade card (at 50MHz) needed only about one-fifth more time than was required by a 6100/60 for the same tasks—surprisingly fast performance, given the lower speed of the Centris 650 motherboard.

DayStar PowerPro 601

A third upgrade option, expected by the time you read this, is DayStar Digital's PowerPro 601 for the Centris 650 and the Quadra 650, 700, 800, 900, and 950. This card should come in two versions—66MHz and 80MHz—and at DayStar's estimated prices of $1200 to $1700, would not be cost-effective for most users. It would appeal, primarily, to a fairly narrow band of users who rely on two kinds of programs simultaneously: native PowerPC versions of high-end graphics and publishing programs, which should be available when or soon after the Power Macs ship, *and* specialized, high-performance 680X0 programs—say, custom statistical, engineering, or scientific programs—that are unlikely to migrate to native PowerPC versions immediately.

Such users would not buy a Power Mac or a motherboard upgrade, because of the degraded performance with emulated 040 applications. The PowerPro, if it meets DayStar's predictions, could offer the best of both worlds: blazing performance for native PowerPC applications; and no performance hit to 040 applications, which would run off the 040 motherboard (after you restart the Mac).

DayStar anticipates that its PowerPro card will be speedier than Apple's upgrade card because PowerPro cards will run at 66MHz or 80MHz, independent of the host Mac's speed, and can use Quadra-style SIMMs, increasing the total RAM available. The PowerPro will have faster access to its own RAM than it has to RAM on the host motherboard. The PowerPro also has a slot for an extra RAM cache.

The burning question is whether the PowerPro can justify its $500 to $1000 premium with significantly better performance than Apple's upgrade card. Unfortunately, DayStar did not have a prototype ready for Macworld Lab to test.

The PowerPro 601 will come with the software necessary to run native PowerPC and emulated 680X0 applications, including ROM software licensed from Apple. The DayStar upgrade card, like the Apple card, will use the host motherboard's NuBus slots, back-panel ports, built-in video, and RAM.

Other upgrade options should be out later this year. Applied Engineering is negotiating a license for the Power Mac ROM from Apple and plans to make upgrade cards for Macs that have a 68040 CPU and a PDS slot. Apple will provide upgrades for the LC 520, 550, and 575, and the Performa 550, although the company has not said whether the upgrades will be a replacement motherboard or a plug-in card. Apple also plans an upgrade for the Quadra 605, Performa 475 and 476, and the LC 475. DayStar plans to migrate the PowerPro upgrade cards to other color Macs, but has not announced which models it will release first.

Recommendations

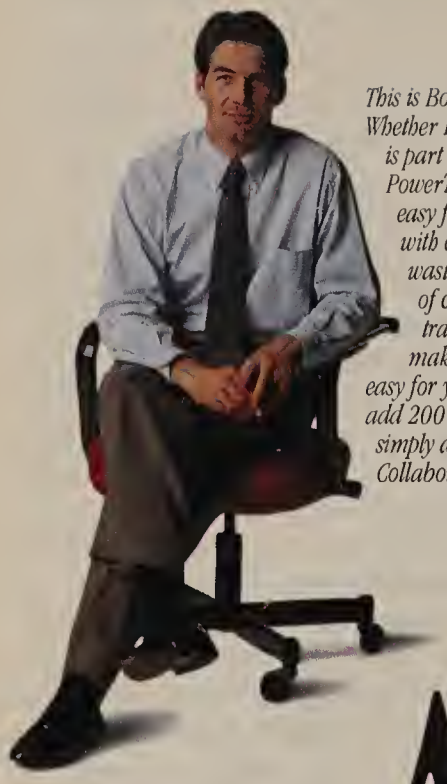
No matter which Mac you have, you can always sell it and buy a new one. Depending on the price you get for your old Mac, a replacement may cost less than a retrofit. A good reason to keep a Quadra 900 or 950: they have more expansion slots than any Power Mac, even if you fill one with a PowerPC upgrade card.

If you decide not to buy a new Mac, consider these options:

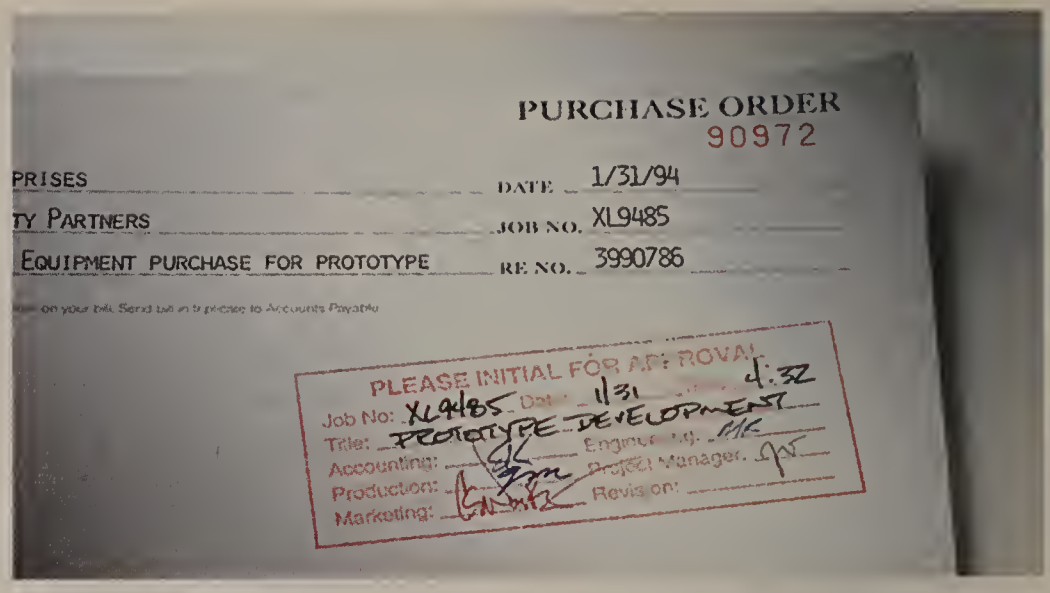
- **Centris and Quadra 610** owners can choose Apple's motherboard upgrade or a Power Mac Upgrade Card. At $1000, a 6100/60 motherboard costs only $300 more than the upgrade card, and its greater performance and functionality are well worth it unless you need to run 680X0 software on a real 68040 CPU. Moreover, the new motherboard increases your total RAM by 4MB—eliminating about $120 of the price differential.
- **Quadra 700, 900, and 950** owners can choose either upgrade card. If top performance when running native PowerPC applications and the ability to run 040 applications in native mode are both vital, and price is no object, consider DayStar's PowerPro 601; but check the most current reviews to make sure they verify DayStar's expectations. If moderate performance is acceptable, save $500 to $1000 and get Apple's upgrade card.
- **Centris 650, Quadra 650, and Quadra 800** owners can choose a motherboard upgrade or either upgrade card based on the advice in the preceding paragraphs. Apple's upgrade card is much cheaper than the motherboard upgrades for these Macs (unlike for the 610), making the upgrade card a worthy choice if you want to spend as little as possible to run native PowerPC software.
- **IIvx, IIvi, Performa 600, Quadra 660AV, and Quadra 840AV** owners have only one choice, an Apple motherboard upgrade.

An Apple motherboard upgrade turns your old Mac into a full-fledged Power Mac, while Apple's Power Mac Upgrade Card and DayStar's expected PowerPro 601 let you hedge your bets by running PowerPC software on the upgrade card and 680X0 software on your Centris or Quadra motherboard. Either way you get Power Mac performance without buying a new computer. **m**

LON POOLE is a *Macworld* contributing editor who regularly covers new Macintosh technology



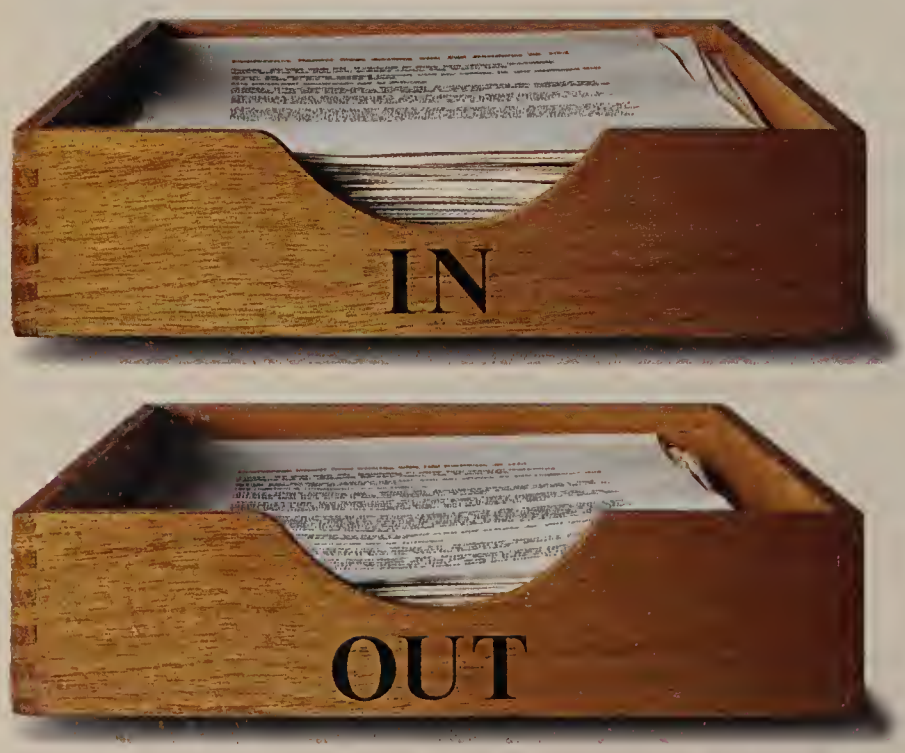
This is Bob, the new employee. Whether Bob works at home or is part of your office network, PowerTalk software makes it easy for him to collaborate with colleagues—without wasting his energy on lots of complex procedures or training. Plus, PowerShare makes network expansion easy for you. So easy, you can add 200 or 2000 more Bobs by simply adding more PowerShare Collaboration Servers.



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Announcing conserve energ

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You can spend your time and energy learning five different communications programs. Or, you can use PowerTalk, which lets you send faxes, e-mail or any other kind of message, all with one simple procedure—right from the program you're already working in.

*© 1994 Apple Computer, Inc. All rights reserved. Apple, the Apple logo, Macintosh and "The power to be your best" are registered trademarks and DigiSign, PowerShare and PowerTalk are trademarks of Apple Computer, Inc. *Gateways are readily available from other companies, and are sold separately*

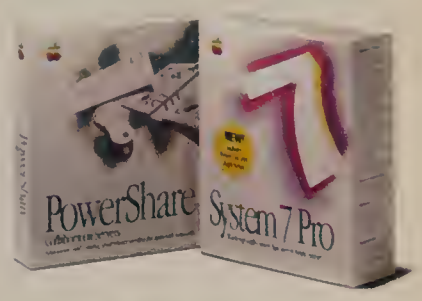


With PowerTalk, sending a simple business letter is the last thing you'd expect: simple. Instead of fiddling with passwords and enclosures, just drag your letter icon onto the recipient's business card icon. PowerTalk does the rest.

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In a world of immovable deadlines and shrinking bottom lines, you've got better ways to spend your energy than fiddling with passwords, enclosures and multiple interfaces. Recognizing this, the engineers at Apple created two of the most helpful networking innovations in the history of personal computing: PowerTalk™ and PowerShare™ Collaboration Servers software. With these improvements, your Macintosh® now automatically does many of the tasks you used to do manually—so you can focus on working with your colleagues, instead of focusing on getting your computers to connect. PowerTalk is the first piece of software



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You install PowerShare server software on a Macintosh or an Apple® Workgroup Server by simply pressing a button. What's more, a PowerShare network is as easy to expand—and maintain—as it is to set up.

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designed to make collaboration easier for individual users. Instead of bothering with separate voice mails, faxes and e-mails, all communications now reside in a single mailbox. And all messages are sent and received with the mere click of a mouse—no separate programs, no separate passwords. Plus, a catalog feature even lets people keep detailed information on their colleagues: numbers, addresses and instructions on how to send them information. PowerShare makes setting up a network equally simple. The software is easy to install and easy to maintain. Keeping track of people is easy, and adding new people is easy. To see how PowerTalk and PowerShare can help your company, call 800-732-3131, ext. 200, for the name of the authorized dealer nearest you. And discover the power that takes the work out of working together. The power of Macintosh. The power to be your best.®

Introducing PowerTalk and PowerShare from Apple

EDITED BY JAMES A. MARTIN

Graphics

THE LATEST IN DESIGN, PUBLISHING, AND PREPRESS

VivaPress Combines DTP and Drawing

BEEN DREAMING OF AN APPLICATION that combines the features of QuarkXPress, Aldus PageMaker, Adobe Illustrator, and Aldus FreeHand in a single package? VivaPress Professional could be just what you've been waiting for.

In VivaPress Professional, text and picture boxes can be any shape, including polygons and editable Bézier curves (as in Adobe Illustrator 5.0, any item can be used as a snap-to guide). The program also promises robust typographic controls (word spacing, letterspacing, and hyphenation), word processing (including search-and-replace and a spelling checker), index and table-of-contents generation, and support for documents up to 2000 pages and spot- and process-color separations.

VivaPress Professional's Alias items represent a revolutionary approach to master pages. You can create multiple aliases of any item, and when you change the original, all the aliases change. There are text styles (for both paragraphs and characters) and object styles (for text and picture boxes) as well. In addition to rotating, mirroring, grouping, and aligning, you can also lock items in a flexible manner, which lets you control how individual users can modify any item. The program also allows you to import and edit Aldus FreeHand documents.

VivaPress Professional was developed by TechWare Computer GmbH, a German software publisher. A U.S. version of the program will cost $895 and should be available in April. TechWare's VivaPress ($299) includes many of the same features as VivaPress Professional but does not offer text mirroring, style sheets, guidelines and objects, production statistics, and long-document support. It will be available in May. TechWare's U.S. distributor is Interpress/MPG, 212/245-2700.—STEVE ROTH



Kodak's Portfolio for Multimedia

WITH EASTMAN KODAK'S PHOTO CD Portfolio format and software—previously announced but now available—illustrators, photographers, business executives, and others can create a multimedia portfolio or presentation on a Mac and have it published on compact disc within a few days.

A photographer, for instance, could produce on the Mac a digital portfolio of his or her work with text and vocal annotations, copy the resulting Portfolio script onto a SyQuest cartridge or other removable media, and hand over the cartridge to a photofinisher or print-output bureau that offers Kodak Portfolio services.

The service bureau can then master the artist's presentation onto compact disc and produce anywhere from one to several hundred copies of the disc. A Portfolio Photo CD can be played back on a Mac's or Windows-based PC's CD-ROM drive (with Kodak's Photo CD Player software utility), or on a 3DO, CD-I, or other Photo CD–compatible player connected to a television monitor. A Portfolio CD supports up to 700

images in 24-bit color at 512-by-768-pixel resolution, or up to one hour of audio, or a combination of the two.

Kodak is now shipping software for creating Portfolio CD presentations on the Mac. Kodak Create-It ($245) lets you design, frame by frame, a presentation combining images (in Photo CD, TIFF, PICT, and other formats), audio (standard Redbook format), text (TrueType and PostScript), and QuickTime movies. Kodak Arrange-It ($395) offers the same capabilities as Create-It—except for frame-by-frame layout. Arrange-It also lets you build more-sophisticated, interactive presentations that include, among other effects, delays and transitions.

Kodak is making the Portfolio script language available free to software developers, so that users of other presentation software can use packages they already own to create Portfolio-format discs. Eastman Kodak, 716/724-4000, 800/242-2424, ext. 36.—J.A.M.



Portfolio Eastman Kodak's new Photo CD Portfolio format and software let you create multimedia presentations on a Mac and publish it on a CD.

Tektronix Sharpens Thermal Color

THERMAL-WAX COLOR OUTPUT JUST got sharper, thanks to two new Tektronix printers that are reportedly the first thermal-wax devices to offer 600-by-300-dpi color output.

Tektronix is now shipping the Phaser 220i and Phaser 220e, both of which offer PostScript Level 2, plain-paper, letter-size output at 2 pages per minute. The printers employ the TekColor SuperCell 600 technology, which improves image and text quality by doubling the number of dots printed on a page in one direction. The two new Phaser models also include dithering algorithms for generating deeper colors and smoother color transitions, as well as tables for simulating SWOP (Specifications for Web Offset Publications) press colors.

Both printers come with parallel, serial, and AppleTalk ports. The 220i also



ROBERT PERRY

Tektronix Phaser 220i

offers support for Novell NetWare and Apple EtherTalk with a $695 Ethernet option (TCP/IP support is an additional option for $295). All network ports are simultaneously active. In addition, the 220i and 220e support Hewlett-Packard's Graphics Language (HPGL) and Printer Control Language (PCL5).

The Phaser 220i ($5995) comes with 10MB of memory (expandable to 14MB), 39 Adobe Type 1 fonts, a SCSI port for a hard drive, and a 24MHz AMD 29000 RISC processor. The 220e ($3995) ships with 8MB of memory (not expandable), 17 Adobe Type 1 fonts, and a 16MHz AMD 29000 RISC chip. Tektronix, 503/682-7377, 800/835-6100.—J.A.M.

Real-Time Imaging Card

THE STRATEGY IMAGICIAN IS BILLED as a high-speed, object-oriented imaging system for graphics and prepress professionals who must routinely manipulate a high volume of images quickly and effortlessly. Developed by MacEurope Information Systems of Great Britain, the Imagician consists of a NuBus card with 16MB of on-board memory and an application program called Imagician Workshop that runs in 500K, although 1MB is recommended. A Mac with 24-bit color and a minimum of 4MB of memory is required. The Imagician complements paint and image-editing software such as Adobe Photoshop and Fractal Design Painter; it enables users to perform—in real time—a wide range of time-intensive operations, including rotate, scale, clone, color balance, sharpen, bend, mask, and filter.

Rather than improve performance by substituting a proxy image on which to perform manipulations, as does HSC Software's Live Picture program, Working Software's Imagician works on the actual image through a sampling process that's transparent to the user. The first version of the Imagician, which is expected to be available by the time you read this, will handle TIFF and CMYK files up to 16MB. The next version (a free upgrade, due in March) will use MacEurope's proprietary object-oriented architecture (Pixel Placement Technology) to boost that limit to 64MB and will add support for EPS and Scitex CT formats. It will also include a batch-processing mode.

Marketed and supported in the United States by Working Software, The Strategy Imagician retails for $3495.95. Working Software, 408/423-5696, 800/229-9675.—CATHY ABES

IN BRIEF

■ **Dabbling and Drawing** Fractal Design's new 16-bit, bit-mapped natural-media program, Dabbler ($99), is aimed at novices of drawing and painting. The program's simple interface includes drawers for tools, papers, and colors. Dabbler can read and write 24-bit color files and includes 54 paintbrushes and 20 paper effects. 408/688-8800, 800/647-7443.

■ **Big Color Output** LaserMaster's new BigColor workstation consists of a Mac Quadra or a 486-based PC; a customized selection of software and hardware; and LaserMaster's DisplayMaker large-format, ink-jet color printer. DisplayMaker can produce photographic-quality color output up to 36 inches wide and 18 feet long. Workstations begin at $35,000. 612/944-9330, 800/688-8342.

■ **Typestry Update** Pixar's Typestry 2.0 ($299; upgrade $99) converts fonts and Adobe Illustrator files into 3-D objects. The new version includes two new build methods: one warps text onto spheres or flags, and the other creates neon tubes. You can edit bevels, create custom Looks from PICT and TIFF files, and perforate objects. Version 2.0 has a controllable animation time line and a hierarchical score window. 510/236-4000, 800/888-9856.

Can HP *give you affordable color* PostScript

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PostScript software is now available for three HP DeskWriter printers.

Take a good look, because you've probably never seen PostScript™ color printing this affordable before. But here it is, right before your very eyes.

Hewlett-Packard now offers PostScript software for the HP DeskWriter 520, 550C and 560C printers, providing Mac users with true Adobe™ PostScript language capability and color output like you've never seen before.

For a list price of under $250,* PostScript Software for the HP DeskWriter Family gives you support for black & white printing at 600 x 300-dpi resolution. Along with 35 standard PostScript fonts, support for Adobe Type 1 and TrueType™ fonts, PostScript language file portability and background printing. All that on a printer that uses HP's own inkjet technology, works with your software, and comes with a three-year warranty, the longest in the industry.

For a closer look at a truly affordable way to get true Adobe PostScript printing, look in your local Yellow Pages for the name of the HP authorized dealer nearest you.†

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Expert Graphics

GRAPHICS PROFESSIONALS SHARE THEIR SECRETS

by Cathy Abes

Artist: Stuart Bradford, a San Francisco–based illustrator, designer, and photographer, has been creating Macintosh graphics since 1991. His illustrations have appeared in such magazines as *Success* and *Publish*.

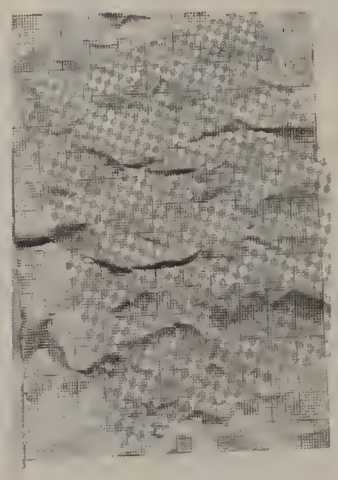
How It Was Done: For the illustration that opens our feature article on PowerPC Macintosh applications, Bradford began by creating the background. First he scanned a crumpled piece of graph paper to create a texture. After drawing a checkerboard pattern in Illustrator, he imported that file into Photoshop and copied it into an alpha channel of the scanned texture file, then loaded the selection into the RGB channel.

After applying the Andromeda Series 2 3D Filter (a third-party Photoshop plug-in) to give the image perspective, he changed to RGB mode and inverted the file to change the background color from yellow to blue.

The rocket began as a pencil sketch, which Bradford scanned, saved in EPS format, and opened in Illustrator. There he used it as a template for drawing a partial outline, from which he created a three-dimensional object in Sculpt 3D. After mapping the texture onto the object's surface, he imported it into Photoshop. Because Sculpt 3D lets you make a mask file of the 3-D objects it creates, Bradford was able to bring that mask into an alpha channel in Photoshop.

Next, he focused on the fins of the rocket, which he had previously drawn in Illustrator. After pasting them into an alpha channel in Photoshop, he positioned them so they would be on either side of the rocket cylinder. Saving the fins as a separate mask enabled Bradford to apply the surface texture to them.

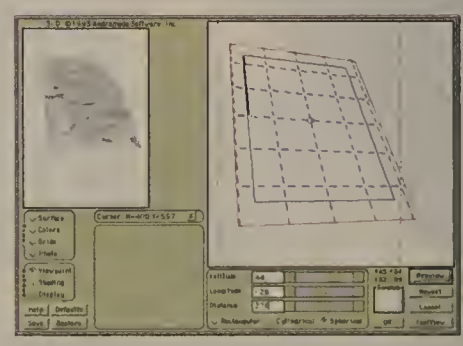
To create the light-to-dark gradation on the rocket, Bradford used the blend tool's Darken mode. Then he loaded the selection into the RGB channel, which made a graduated mask of the whole rocket with the back part of the rocket selected. Finally, he used the Levels command to darken the selection. **m**



1 After scanning a crumpled piece of graph paper into Photoshop, Bradford combined the scan with a checkerboard pattern he had drawn in Illustrator.



2 Using the Andromeda Series 2 3D Filter, he projected the image onto a plane, where he adjusted the plane's latitude and longitude to give the image some depth (below). Above is the background after he had changed the mode from gray scale to Duotone and given it a yellow ochre color.



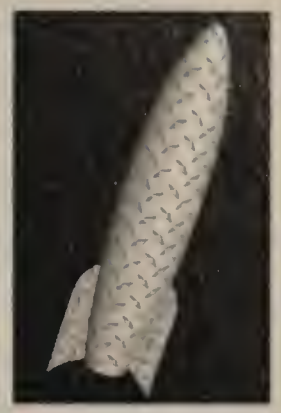
THE TOOLS

Hardware: Mac Quadra 800 with 56MB of RAM and a 240MB internal hard drive; RasterOps 24XLi color card; Seiko Trinitron 19" color monitor; 525MB external hard drive; Mirror CD-ROM drive; 44MB SyQuest removable-cartridge drive; Wacom 12-inch graphics tablet; Mirror 600 color scanner.

Software: Adobe Photoshop 2.5.1; Adobe Illustrator 3.2; Sculpt 3D 3.11; Andromeda Series 2 3D Filter for Photoshop; Adobe Dimensions 1.0; PhotoDisc Volume III, Backgrounds and Textures; CADMover 3.4.







4 Bradford pasted the mask of the 3-D rocket into a Photoshop alpha channel (top left). After pasting the surface texture into the fins selection (which was loaded into RGB from a separate alpha channel), he loaded the rocket selection into the fins alpha channel to combine the two masks (bottom left). The completed rocket is shown on the right.







3 The scanned pencil sketch of the rocket (left) Bradford used as a template for drawing a partial outline (middle), which he brought into Sculpt 3D via Kandu Software's CAD-Mover. In Sculpt 3D, he revolved the outline to create a three-dimensional rocket cylinder and then mapped the texture onto it (right).



5 Bradford dragged over the alpha channel with the blend tool in Darken mode to make the front of the rocket black, the middle gray, and the tail white (above). After loading the selection into the RGB channel, he adjusted the rocket's color levels to darken the back of the rocket (left).

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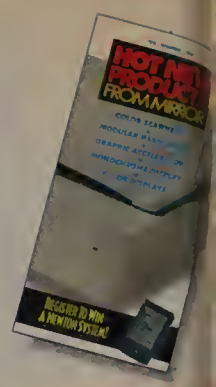
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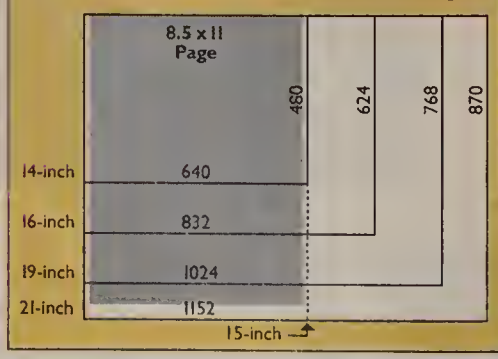
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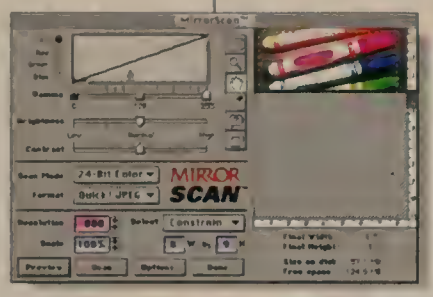
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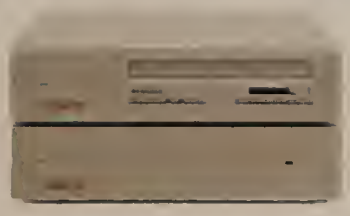
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Are You Breaking the

A GUIDE TO IMAGE



DAVID PETERS

COPYRIGHT DO'S AND DON'TS

Law?

BY JAMES A. MARTIN

You have an assignment to create a conceptual illustration for a national magazine, and the deadline is imminent. After working for hours on your Mac trying to get the desired effect, you realize what your image needs is a touch of blue sky. So you pick up a recent coffee-table book of aerial photography, find a photo with blue sky in it, scan the photo into an image-editing program, import a portion of the sky into your drawing program, and use it as a texture in your illustration.

It's an easy solution; your image looks great, and you've finished the assignment on schedule. There's only one problem: you have just broken the law.

According to current copyright statutes, your appropriation of the sky is a *derivative use* of the original photograph. Unless you received permission from the copyright owner for such use, you've violated the owner's copyright. But in this case—as in practically any situation involving computers and copyrighted materials—the situation is not black or white. In fact, there are several mitigating shades of gray to consider. For example, in the original photo, how distinctive, or representative of the originator's work, is the sky? How important is the sky to the original image—is it simply part of the background, or is it the focal point? How much of the sky did you use for your image? Did you change the color or otherwise alter the sky? And perhaps most important, how likely is it that your use of the sky has damaged the photographer's ability to sell his or her original work again?

With the costs of computers and scanners dropping on what seems like a daily basis, and with the proliferation of digital images available from online services, CD-ROMs, and electronic documents, it's easier than ever before to "borrow" some blue sky here, some green grass there—or to copy an entire image. The technology has advanced so rapidly that the boundaries between right and wrong, between inspiration and infringement, are becoming increasingly blurred.

To sort through some of the many gray areas of copyright law, *Macworld* interviewed a variety of Mac graphics professionals about their copyright concerns. What follows are some of their most frequently asked questions, along with responses from attorneys and experts who specialize in the areas of publishing, graphics, computers, and copyright protection. Though we've highlighted some situations visual artists have been in, it's important to remember that copyright law is extremely technical, and its application can vary greatly from one situation to another. In other words, better play it safe and get permission—paying a licensing fee is almost always cheaper than hiring an attorney.

Q. *In the example already mentioned, how likely is it that the artist who scanned a bit of blue sky would be challenged by the copyright owner?*

A. In this particular case, it's probably unlikely—with emphasis on *probably*. Borrowing a small portion of someone else's image and using it in your own represents what is "the ultimate gray area" in copyright law, says Tom Smedinghoff, an attorney specializing in computer and copyright issues for the Chicago law firm McBride, Baker, & Coles.

"When you scan that photo [from the aerial-photography book], you are, in effect, infringing the copyright of that image," Smedinghoff explains. "Then, when you lift a portion of the photo, you're adapting or modifying that image without permission. That constitutes another act of infringement, because the copyright owner has the sole right to adapt or modify his or her own work. Once you've incorporated the sky, or whatever, into a new image, every time a copy of that image is made, the original owner's copyright is infringed again."

But if the portion of the photo you've appropriated is minimal and insignificant to the original image as a whole, then "maybe what you've done doesn't really rise to the level of infringement," Smedinghoff adds. Again, that's a big if: current copyright law does not offer guidelines regarding how much of a work can be copied without infringing (see the fair-use section in "Copyright Basics").

Recent decisions in the popular-music industry offer some guidelines for artists and desktop publishers, Smedinghoff says. In a 1991 lawsuit, singer Gilbert O'Sullivan sued rap performer Biz Markie and eight other defendants for sampling, or includ-

ing without permission, a small portion of O'Sullivan's tune "Alone Again (Naturally)" in Markie's song "Alone Again." The rap song borrowed just three words and eight bars of music from O'Sullivan's 1972 hit, but *what* it borrowed—particularly the words *alone again, naturally*—was an important part of the original tune. Markie's attorneys defended his actions on the grounds that stealing bits and pieces from songs was common in the music industry, but the court ruled against the rapper. Had Markie used a less recognizable or less important part of O'Sullivan's song, Smedinghoff says, it's possible there would have been no judgment against Markie.

The fair-use privilege allows for a limited amount of copying, without permission, for the purposes of commentary, news reporting, and other uses outlined in "Copyright Basics." Many copyright infringements occur when fair use is interpreted too broadly, experts say (see the screen shots in "Burning Mad over Flying Toasters"). When borrowing blue sky or green grass from someone else's work, for instance, the artist might assume that the small amount being taken constitutes fair use.

In borrowing the blue sky, "There is no degree of commentary or criticism involved," says Brad Bunnin, a publishing attorney based in Point Richmond, California. "A strict legal analysis would say that you can't do that. But if the taking is relatively slight and insignificant to the original work, and it doesn't hurt the commercial value of the original, my guess is that most courts would say it's OK."

In a similar vein, some artists, publishers, and advertising agencies mistakenly assume that using a fairly generic photograph or illustration in its entirety as a small portion of a new image is safe. Before you make that assumption again, however, consider what Fred Ward has to say on the subject. A veteran photographer-writer for the likes of *Life* and *National Geographic*, Ward closely guards his intellectual property. Recently, he discovered a full-page ad in a computer magazine that showed business executives watching an audiovisual presentation. On one of the three AV projection screens featured in the ad there was a small photograph, of fiber-optic wires, that Ward recognized as his own work.

Ward knew he had not sold the rights for such a use, so he contacted his copyright attorney. When approached, the AV equipment manufacturer, which had hired an agency to create the ad, reluctantly admitted they had assumed permission was not necessary for the fiber-optic image. They also admitted that the ad had run a total of 19 times in various magazines. "So my lawyer gave them a bill for 19 uses of that photograph, and they paid it," Ward says.

"The point here is simple," Ward continues. "It doesn't matter if your work, even a piece of it, has been incorporated into a collage, a painting, another photograph, or an ad. If you made the image, you own the copyright, and it's yours. The answer to the question of how much can you use of someone else's picture without permission is *zero*—unless you're willing to risk a lawsuit."

Q. *One artist said she often scans photos from obscure magazines of the 1930s and 1940s, colorizes or otherwise alters them, and uses them as the central images for photo illustrations. Is she guilty of infringement?*

A. Not if the copyrights for those magazines or any of its contents have expired, due to age or lack of proper copyright notice. At that point, such publications and their contents fall into the *public domain*, which means they can be reproduced without permission. Under the prior law, a published work's copyright lasted for 28 years and could be renewed for an additional 28-year term, thereby protecting works for no more than 56 years. Copyright law was significantly revised in 1976; the revisions went into effect on January 1, 1978. Under the revised law, the copyright of any published work still in its first 28-year term of protection as of January 1, 1978 (meaning the work would have been published in 1950 or

COPYRIGHT BASICS

- **What copyright is** A copyright is a protection under Title 17 of the U.S. Code offered to the authors of literary, dramatic, musical, artistic, and other intellectual properties, whether published or unpublished.

  A copyright protects the particular manner in which a work's contents and ideas are expressed. You cannot copyright ideas, facts, titles, short phrases, slogans, or names, among other things.
- **Trademarks** Trademark and unfair competition laws allow you to protect words, names, short phrases, symbols, and other devices that identify and distinguish goods or services. The Apple Computer logo, for example, is protected by trademark, not copyright.
- **What copyright does** A copyright gives the author limited exclusive rights to reproduce the work, create derivative works based on the original, distribute copies of the work, and perform or display the work in public.
- **Work for hire** The author usually owns the copyright automatically, unless he or she prepared the work as a *work for hire*, in which case the artist's employer presumably owns the copyright. The authors of a collaborative work own its copyright jointly.
- **Fair use** The *fair-use doctrine* allows for copying, without permission, for such purposes as criticism, commentary, news reporting, teaching, scholarship, and research. There are four main factors that determine fair use: (1) the purpose of the use (whether the copying is intended for commercial or nonprofit purposes); (2) the nature of the original (whether it was published or unpublished is one consideration here); (3) the amount and importance of the portion used in relation to the original work as a whole; and (4) the impact of the use on the original work's commercial value.
- **Copyright duration** Copyrights are not eternal. When a copyright expires, the work falls into the public domain, and anyone is free to use it without permission. Any work created on or after January 1, 1978, is automatically protected by copyright from the moment it was created. For these works, the copyright expires 50 years after the author's death. Works created before but not published or registered until after January 1, 1978, receive the same protection as works created on or after that date. Works created and published or registered before January 1, 1978, and that were still under copyright protection on that date, are now copyrighted for a total of 75 years from the date they were created, published, or registered.

  To register a work, you must fill out an application form, pay $20 per application, and send one or more copies of the work to the copyright office. For more information, write to The Copyright Office, Information and Publication Section LM-455, Library of Congress, Washington, D.C. 20559, or call 202/707-3000.

later), could be renewed for an additional 47 years—giving a work a total of 75 years of protection. Any published work in its *second* 28-year term of protection as of January 1, 1978 (meaning it had been published between 1922 and 1950), received an automatic copyright renewal for a total of 75 years. So any work published in 1922 or thereafter could still be protected—if the copyright owners renewed the original copyright after its first term expired.

Also, works published before March 1, 1989, were required to carry a copyright notice in order to be protected, says Bernard Burk, *Macworld*'s intellectual property attorney and a partner in the San Francisco firm Howard, Rice et al. Notice requirements were particularly stringent prior to 1978, he adds. Therefore, if the 1930s and 1940s magazines did not carry a proper copyright notice, Burk says, then they have lost their right to protection.

Depending on how an image from an old magazine is used, the likelihood that someone would recognize the original work and contest its reuse today is probably low, according to Bunnin. "Someone would have to see the new image and remember the magazine it originally appeared in," Bunnin says. "Then there's the question of damages—what are those original images really worth now? The answer is: probably not much. Even if someone does challenge your use, unless it's a recognizable, keystone image you've used, the odds are you would end up paying only a permissions fee."

Q. *Do you need permission to publish photos of famous paintings or other works of art, even if, because of their age, they're in the public domain?*

A. Yes, though it's not because of copyright. The world's great works of art are generally owned by museums or collectors, and under ordinary private-property laws, everyone has the right to restrict or grant access to their possessions, says Burk. For instance, if you live in New York and you'd like to snap a photo of one of Monet's water lily paintings for your presentation, you must ask the Museum of Modern Art, which owns the paintings, for permission to bring in your camera to take the picture. If the museum doesn't agree, you'd need to obtain a photo or transparency of the water lilies from the museum or from a stock-photo agency. That photo is most likely copyrighted, and you'd need to pay a licensing fee for its use.

Q. *Is it OK to copy images from foreign publications without getting permission?*

A. Definitely not. The United States is a member of several international copyright conventions, such as the Berne Convention and the Universal Copyright Convention. Under these treaties, American copyright laws protect, within the United States, publications and works produced in any foreign countries that are members of these conventions (most industrialized countries are). This means that a copy of British *Vogue* enjoys the same copyright protections in the United States as the American version of *Vogue*; conversely, American *Vogue* is protected in Britain by British copyright laws.



Burning Mad over Flying Toasters In fall 1993, Delrina Corporation released a screen saver, Opus N' Bill (shown at left), which parodied Berkeley Systems' famous After Dark flying-toaster screen saver (right). Berkeley Systems sued for copyright and trademark infringement; Delrina claimed its toasters were a fair use. The judge ruled against Delrina, saying its screen saver directly competed and was not protected as free speech. Delrina was forced to recall some 12,500 copies of the software, revise the drawing, and pay Berkeley Systems an undisclosed amount.

Q. *Can a desktop publisher use photos of celebrities in a newsletter or brochure without permission?*

A. It depends on the use. There are two important considerations here. One is a celebrity's right of publicity (or any person's right of privacy); the other is the copyright protection of a particular photo in which a celebrity or other individual appears. Many people assume that public figures are public property, but you absolutely can't use anyone's image—celebrity or not—for any advertisement or endorsement without permission. The image doesn't even have to be a celebrity's exact likeness to be considered an infringement. In January, for example, Vanna White was awarded $403,000 in damages from Samsung Electronics, because Samsung ran an ad featuring a blonde robot in a game show setting that resembled "Wheel of Fortune."

In addition, the celebrity doesn't even have to be alive, says Keith Lutsch, chairman of the Texas bar association's copyright committee and a patent attorney for the Houston firm Pravel, Hewitt, Kimball, & Krieger. "Elvis Presley's image is one of the most carefully protected," Lutsch adds, and Tennessee, where Presley lived, has the most far-reaching rights of privacy and publicity laws in the country.

You're less likely to get into trouble when using a celebrity's image for editorial purposes, as with



Don't Try This at Home This recent catalog advertisement touts a hand-held scanner called the Rip-Off Artist. The ad does contain two copyright-infringement warnings, but they do not stand out like the large boldface type encouraging buyers to "lift a photo, logo or drawing and transfer it to a report, manual or article" and to "rip off graphics (and now text) risk-free "

HOW TO AVOID COPYRIGHT CONUNDRUMS

1. Get permission. This is often easier said than done, of course—especially when you don't know how to reach the copyright owner or don't have an attorney who can help you. In those cases, you can contact rights and permissions agencies. BZ/Rights & Permissions (212/580-0615, fax 212/769-9224) charges $195 for the first hour, $125 per subsequent hour, and will help you negotiate rights as well. Thomson & Thomson (202/835-0240, 800/356-8630) performs searches only; flat-fee rates are $60 and up, and rush services are available.

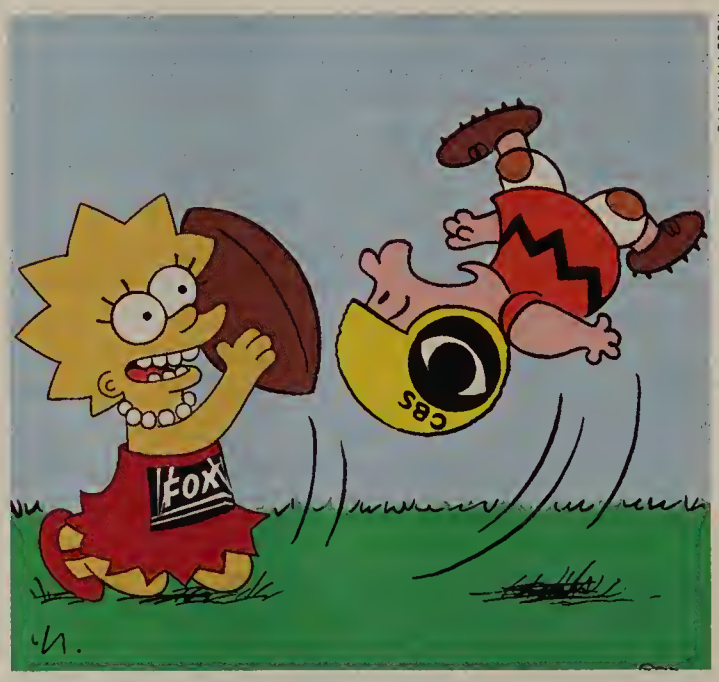
The Copyright Office performs copyright-registration searches for $20 an hour. Write to Library of Congress, Copyright Office, Washington, D.C. 20559, Attn: Reference and Bibliography Section; or call 202/707-6850.

2. Buy royalty-free stock photos, background textures, and clip art. There are many collections of high-resolution photos and other images available on CD-ROM (floppies, too). Make sure to read the licensing agreements before you buy, though—royalty-free doesn't always apply to every situation. Contact Educorp (619/536-9999, 800/843-9497) for a catalog of CD titles.

3. Create your own stock-image library. The next time you need a photographic image as a source for your illustration, take the picture yourself with a 35mm camera. Using Eastman Kodak's Photo CD format, you can easily and inexpensively amass your own collection of stock images.Contact Kodak, 716/724-4000 or 800/242-2424.

4. Educate yourself. Contact the Copyright Office for its printed information, which is, for the most part, easy to read and understand (see "Copyright Basics" for the address). The Graphic Artists Guild (212/463-7730) publishes *Graphic Artists Guild Handbook: Pricing and Ethical Guidelines* ($24.95; 1991), which contains information on copyrights. Another popular resource, the *Legal Guide for the Visual Artist* ($18.95; 1989; Allworth Press, 212/777-8395, 800/247-6553), is currently in its second edition; a third edition is due in September. Prentice Hall Law & Business (201/894-8260, 800/447-1717; fax 201/894-0074) offers binder-format publications that can be easily updated: *The Publishing Law Handbook: Second Edition* ($180; updated to 1993) and *Multimedia: Law & Practice* ($125; 1993) both offer extensive copyright information.

5. Join a professional organization. Many organizations work to educate their members about copyright law and can be invaluable in helping them protect their work. Among those organizations active in pushing for better copyright protection are the Graphic Artists Guild and the American Society of Media Photographers (212/889-9144).



GARY HALLGREN

What's Fair Cartoonist Gary Hallgren created this illustration for an *Entertainment Weekly* news article, which reported on the Fox network's successful bid to win broadcast rights to the National Football Conference away from CBS Sports. To illustrate the story, Hallgren drew direct imitations of cartoon characters Lisa Simpson and Charlie Brown. According to Hallgren and *Entertainment Weekly* representatives, the characters' appearance in this illustration is a fair use, as the cartoon comments upon a news report, and the characters aren't being used to sell a commercial product.

newsletters, newspapers, or magazines. As long as the image is used to appropriately illustrate news reporting or some form of commentary or criticism, most likely it's fair use, says Smedinghoff. But while a celebrity is a public figure, it's important to remember that a particular photo of that celebrity is subject to the same copyright protections as any other original work, Smedinghoff cautions.

Q. *How do you find out who owns the rights to an image if it's not apparent?*

A. There are companies that will search for the copyright owner of a particular work for a fee. Thomson & Thomson in Washington, D.C., and BZ/Rights & Permissions in New York are two examples (the latter will also negotiate usage rights on your behalf; see "How to Avoid Copyright Conundrums" for rates and contact information). You can also ask the U.S. Copyright Office in Washington, D.C., to perform a search, but don't expect lightning-fast results.

Q. *What can artists do to protect their work from copyright infringement?*

A. The moment you create an image, it's copyrighted—you don't even have to register the work with the Copyright Office. Under current law, though, your work must be registered before you can file a suit. Should the judge rule in your favor, says Burk, you can collect either *statutory* or *actual* damages, as well as attorneys' fees, and obtain an injunction against any further use of the infringing work. If you didn't register your work until after the infringement, however, you can sue only for actual damages and an injunction.

"The victim of copyright infringement is always entitled to actual damages [the amount of monetary losses the victim suffered as a result of the infringement]," says Burk. "But if the losses are small or difficult to prove, the plaintiff can ask the court for statutory damages. In that case, the court picks an amount it considers to be fair compensation."

Professional organizations such as the American Society of Media Photographers (ASMP) and the Graphic Artists Guild are currently pushing a bill in Congress that would enable artists to file for copyright infringement and collect statutory damages and attorneys' fees even if the work is not registered with the Copyright Office. The bill was approved by House and Senate subcommittees last year, and a full Senate vote is expected sometime this year, according to Paul Basista, national executive director for the Guild.

It's difficult to prevent digital designs from being stolen or misappropriated—but not impossible. Whenever possible, try to ensure that a copyright notice accompanies your image. While such a notice is no longer required in order to sue for infringement, at the minimum it keeps a violator from claiming that infringement was done unknowingly.

Another option is to place a watermark, or translucent, copyright notice somewhere within the image. At least one online photography service is giving this solution a try. Arlington, Virginia–based Picture Network International (PNI), which is launching a stock-photography service called Seymour, in mid-1994, has embedded multiple copyright-notice watermarks in each of its online images. The watermarks are too small for most people to detect at low resolutions but are noticeable when the image is printed as a high-resolution CMYK file. PNI's marketing manager David Evans declined to say how this watermark-embedding scheme works.

"Someone could edit those notices out of the image," admits Evans, but they'd end up defacing the image somehow. And the time they'd spend editing out the images could represent more money than it would cost to license the image in the first place.

Q. *Are there any efforts under way to update copyright laws, as a result of the explosive growth in personal computer use?*

A. Most attorneys and experts interviewed by *Macworld* feel that, despite the advances in technology, the current copyright law is sufficient, particularly in relation to images and text. The 1976 Copyright Act (Title 17, U.S. Code) specifically states that protection "does not afford to the owner of a copyright in a work any greater or lesser rights with respect to the use of the work in conjunction with automatic systems capable of storing, processing, retrieving, or transferring information."

Nonetheless, there is growing concern among artists and photographers that they are losing the ability to protect their copyrights as a result of scanners, electronic bulletin boards, and the forthcoming information superhighway. Here again, many are looking to the music industry for inspiration. A few years ago, the industry protested the introduction of digital audiotape (DAT) players in the United States, fearing that the high-quality recording devices would cost musicians and studios millions in lost royalties. In July 1991, device manufacturers agreed to add a 2 percent royalty to DAT recorders and blank tape. The royalties compensate record companies, performers, songwriters, and music publishers for possible losses resulting from unauthorized music recordings made on DAT devices. The royalties will be collected and distributed under the auspices of the Copyright Office.

According to a spokesperson, the Copyright Office is interested in studying the DAT royalty agreement to determine if it could be applied to other situations in which technology easily enables its users to infringe copyrights—computer graphics, for instance. At press time, however, no specific studies were in the works.

"The solution to all of this could be more licensing societies," says Lutsch. Writers and visual artists need their own copyright-licensing organizations along the lines of the American Society of Composers, Authors and Publishers (ASCAP) and Broadcast Music Inc. (BMI), he adds. Those organizations license the works of their members for some common uses such as radio airplay.



BART NAGEL

Everything Old Is New Again For this illustration, which promoted the launching of cable TV's Sci-Fi Channel, artist Bart Nagel scanned small portions of images he found in books and magazines from the 1950s and 1960s. Nagel obtained the electric-razor image, for instance, by scanning a 1950s magazine ad. Nagel did not seek permission to use any of the images because he appropriated, and further altered, only insignificant portions. Most attorneys and experts interviewed by *Macworld* believe that, in general, borrowing a small or generic portion of an image and then changing its appearance is likely to be considered fair use.

Some organizations have already formed. In 1993, for instance, ASMP launched Media Photographers' Copyright Agency (MPCA) to protect and license the works of photographers in the field of electronic publishing (which includes the publication of photos on encyclopedia CD-ROMs and online stock-photo agencies). "MPCA is like the BMI of the photography world," says Peter Skinner, ASMP's communications director.

Ultimately, the question of how to protect the value of a visual artist's work—at a time when electronic images are increasingly, and easily, available—assumes ethical and philosophical proportions.

"There's not a whole lot I would want to do about it," says Louis Fishauf, creative director for Reactor Art & Design in Toronto, Canada, "unless someone copied my entire image outright and is taking away my opportunities to sell it. But if I happen to see a small piece of my work used somewhere else, in a different way, then the question is, Who knows if I originated that particular element in the first place? Artists always borrow from one another," Fischauf says, "and I'm just one link in the chain."

Photographer-writer Ward, however, believes that the ease of appropriating the works of others makes it even more important to vigilantly protect what you create. "Think of it this way," Ward says. "When it comes time to retire, what do you have to live on but the value of your collective life's work? And if you haven't defended that work, you've essentially given it away. *Then* what do you have?" **m**

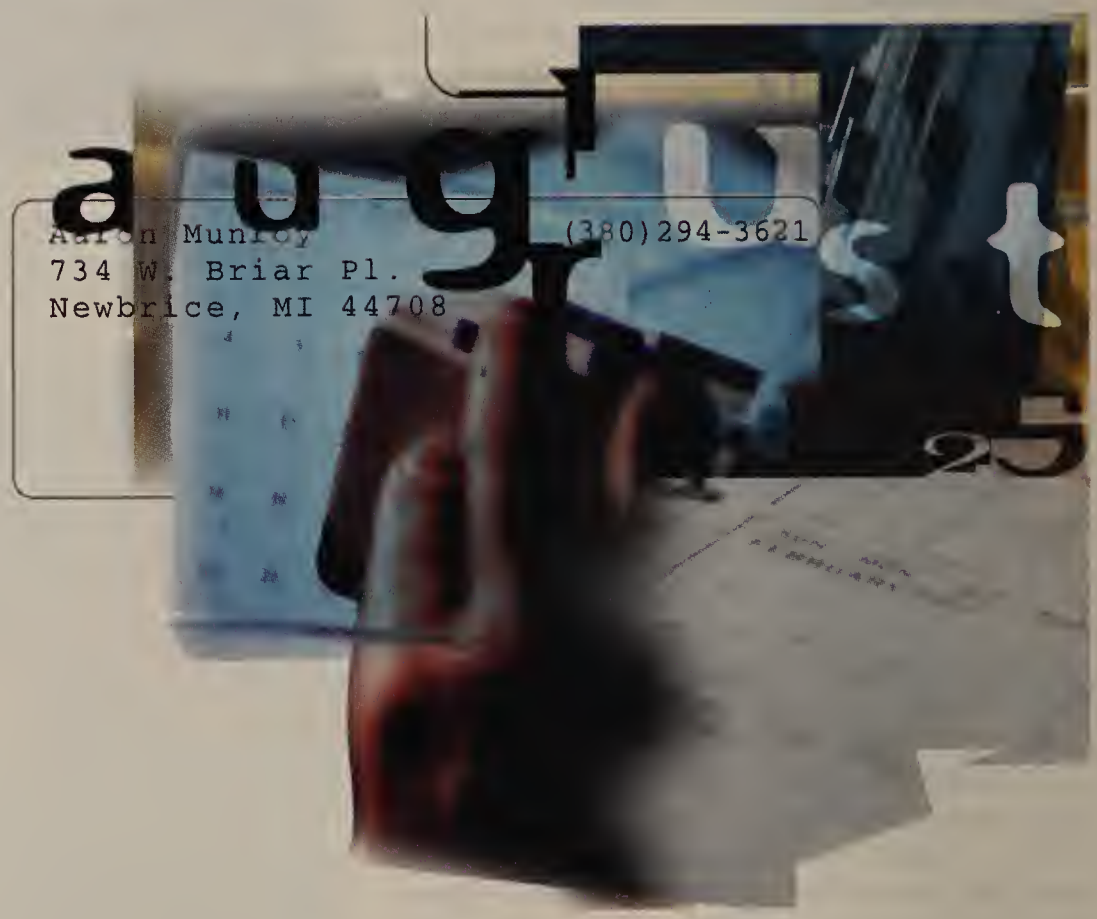
JAMES A. MARTIN is senior associate editor for *Macworld*'s *Graphics* section.

EDITED BY DAN LITTMAN

At Work

THE LATEST TOOLS FOR BUSINESS COMPUTING

TouchBase, DateBook Tighten Ties



ALDUS'S CONTACT MANAGER, TouchBase Pro, and its calendar manager, DateBook Pro, are being revised to feature tighter integration between the two programs and a new interface for TouchBase.

In version 4.0 both programs have optional mini menus to make basic contact-management and calendar functions available in all applications. You can link contacts to events by dragging them from TouchBase into DateBook; an event can have links to multiple contacts.

DateBook Pro 4.0's biggest addition is the Projects feature, which lets you group related events, to-dos, and other items. DateBook also lets users create custom items with preconfigured priority, alarm, automatically entered text, and so on. Custom searches can be saved and reused. Version 4.0 can look up a number in TouchBase and then send an alarm to a pager via Ex Machina's Notify.

TouchBase Pro 4.0 supports links to external programs—for example, DateBook runs as a TouchBase external. Externals, like other parts of TouchBase, each appear on a scrolling page, where they can be collapsed when not needed. Version 4.0 has room for two addresses per contact and can correctly format foreign telephone numbers and postal codes.

Both products should ship in late April or May at $79.95 each or $149.95 for both. Aldus, 619/558-6000.—D.L.

Personal Voice Mail

DO YOU GET A KICK OUT OF SITTING by your answering machine as exlovers and creditors leave desperate messages? High Tide Software's WaterMark and Pleiades Research's Digital Storefront are really intended for small-business voice-mail systems, though with a little imagination you can also steer unwanted callers into a hopeless maze of voice-mail commands.

The Digital Storefront package is $295 and comes with a device that routes voice between the Macintosh and the telephone. It can handle only one telephone line, but the software supports multiple voice-mail boxes; it can create hierarchical series of messages and perform other voice-mail feats such as forwarding messages to other boxes. Messages are displayed in a scrolling list and can be played back on the Mac's speaker. Version 1.1, which should be shipping when you read this, will add fax-back support and be able to forward calls to another number. Pleiades, 713/488-2134.

WaterMark is $499 and includes a device that digitizes and compresses speech before sending it to the Mac. Version 2.0, which is shipping, supports a directory of employees' names and extensions and has a simulated call environment for testing the system you design. High Tide, 510/704-9927.—D.L.

PIM with a Passion

THE SUCCESSOR TO THE SALES-contact manager Field Assistant is Full Contact, a full-featured, general-purpose, personal information manager



Full Contact The list at the bottom of the Activity window (back window) shows that the meeting is linked to three contacts and two to-dos.

with some unusual strengths.

Full Contact lets the user create complex many-to-many relationships between pieces of information by simply dragging one onto another. For example, you can drag several person-items onto several event-items to link the people with a series of meetings, then link several to-do items with each meeting.

Events can be viewed in day, week, and month windows that can be open at the same time, and you can set up custom views and create reusable filters to hide or show certain types of information. Full Contact also has a word processor (with mail merge capabilities) and a telecom module; prints labels and envelopes; dials the phone (it stores multiple dialing configurations, such as one for the office and another for home); and provides alarms and reminders.

Full Contact loads files entirely in RAM, saving PowerBook battery life but possibly restricting file size. Full Contact costs $169 and is shipping. FIT Software (formerly Field Integration Technology), 408/562-5990, 800/725-3734.—D.L.

The Electronic Newspaper

THE INTELLIGENT NEWSPAPER OF the future is available now with Ensemble Information Systems' Relevant, a Mac interface to Dow Jones's electronic news feed, DowVision.

Relevant lets you decide what information you want your newspaper to carry. For example, you could designate column 1 as the government column, and set up your profile to track the federal agencies you want to read about by choosing from a list of about 40 agencies. Relevant will display headlines of the articles it captures from DowVision each day. Click on a story and it opens in its own window, with an option to scroll continuously as you read (you can adjust the scrolling speed.)

Dow Jones's staff assigns keywords to DowVision stories, so Relevant chooses stories based on keywords you select rather than by searching the stories' text—your newspaper's content depends on how well Dow Jones indexes the day's stories. DowVision and Relevant require a Sun Microsystems server, and pricing depends on the number of users: for 100 users, software and data are each about $30 per month per user; for 1000 users, about $7 each per month per user. Ensemble plans to distribute a demo version of Relevant; details were not finalized at press time. Also, Dow Jones plans to make the DowVision information available to individuals using special search software over the Internet; details were unavailable at press time. Ensemble, 415/617-9600; Dow Jones, 800/522-3567, ext. 66.—D.L.

Mac-Assisted Meetings

HOW MANY BURSTS OF INSPIRATION are quickly scrawled in pink or green on conference-room whiteboards—and just as quickly erased? Smart Technologies is developing a line of electronic whiteboards that capture what you write or draw on a screen and save it in PICT format on a Mac. With the software, you can scroll backward to see what was written on the board earlier. The WriteBoard, a 48-inch-by-36-inch wall-mounted unit that is shipping for $2995, uses normal dry-erase markers and erasers and includes a pen tray that tells the Mac which of four pen colors is being used.



CARY CAMPBELL

Smart 2000 Smart Technologies' electronic whiteboards can save felt-pen markings on your Mac or transfer them to another unit.

A $99 software package called Smart Marker allows you to draw or write on an image displayed on the WriteBoard from a Mac screen or projected with an LCD projection panel.

Smart Tech's freestanding Smart 2000 Conferencing System Rear Screen (see "Smart 2000") transfers the image and markings from one electronic whiteboard to another (prices are roughly $15,000 to $20,000). The company is also developing systems that combine videoconferencing with whiteboard functions. Smart Technologies, 403/233-9333.—D.L.

IN BRIEF

■ **STF Polishes Fax Software** STF Technologies is shipping Faxstf 3.0. The $59 fax-modem program adds many new features to simplify preparing, managing, and viewing faxes, including separate windows for incoming, outgoing, and problem faxes; gray-scale dithering that makes faxes easier to read on screen; high- and low-resolution settings; and the ability to configure the modem. STF, 816/463-2021.

■ **WriteNow 4.0 Still Compact** WriteNow 4.0 takes up only 350K on disk and can run in 400K of RAM; a preference setting loads the program completely into memory, reducing disk accesses and prolonging PowerBook battery life. The new version adds a full-featured table editor, can crop and resize imported graphics, has filters for QuarkXPress and Aldus PageMaker, and has a palette to simplify setting up mail merges. WriteNow 4.0 is shipping at $119.95. WordStar, 415/382-8000, 800/227-5609.

■ **Xerox Low-Balls OCR Market** After seeing its AccuText optical character recognition software pushed out of the high-price market by Caere's $995 OmniPage Professional, Xerox Imaging Systems is launching a very inexpensive, full-featured OCR package called TextBridge. The $99 product automatically selects text areas on a page and processes them in the appropriate order, can batch-recognize documents, and retains text styles. Xerox, 508/977-2000, 800/248-6550.

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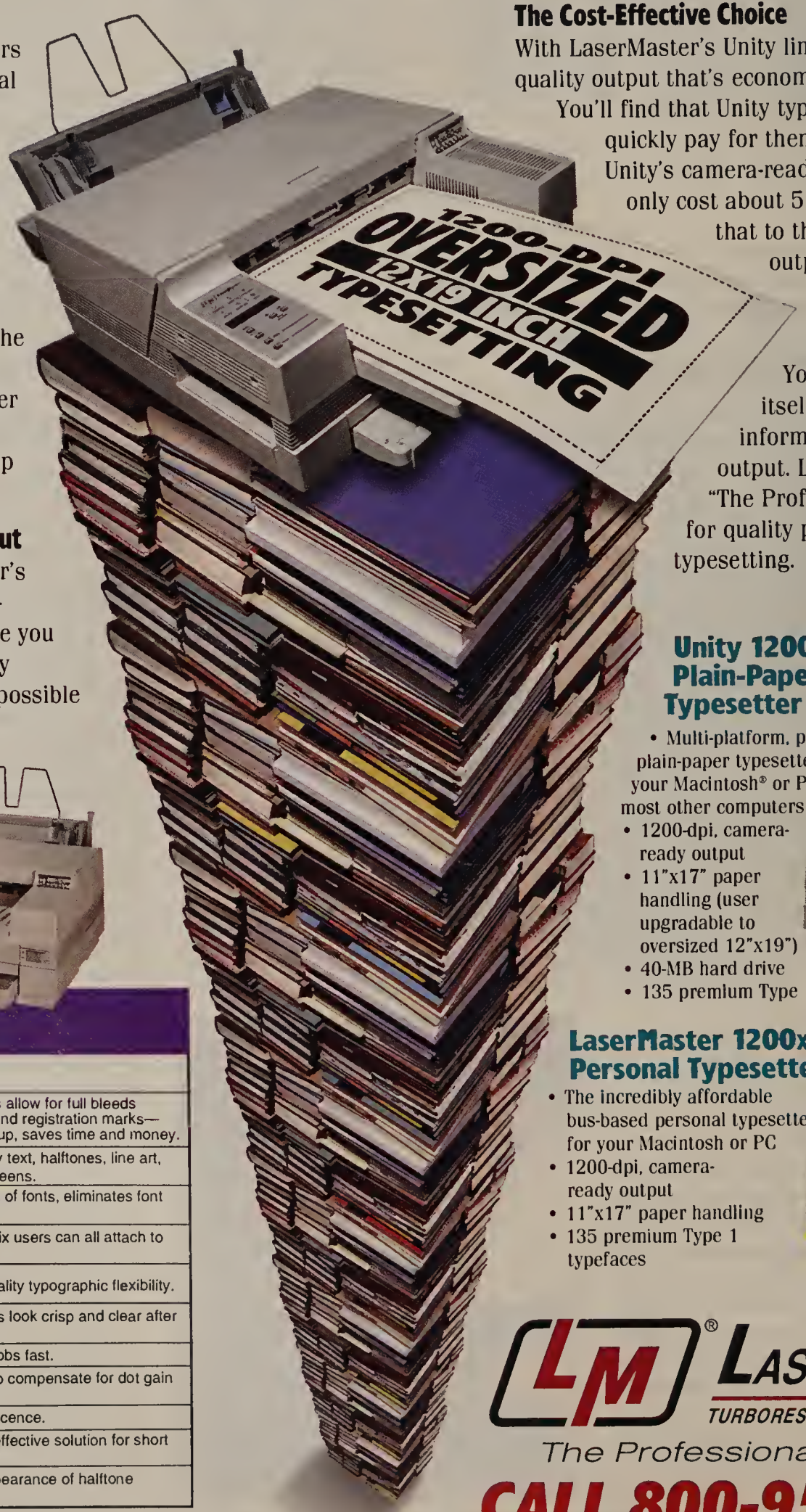
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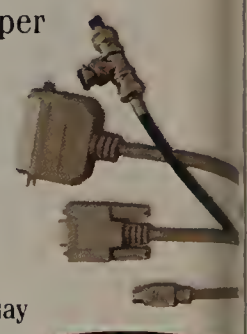
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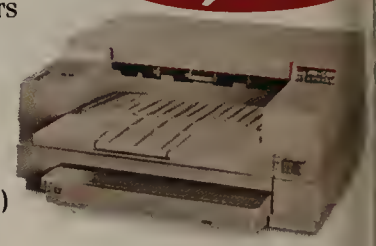
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BY JIM HEID

Working Smart

Communicating with Tables

YOU PROBABLY DON'T SPEND MUCH TIME contemplating it, but tables are everywhere. The sports standings in the morning paper, the bus schedule that gets you to work, the spreadsheets you create at work, the menu you peruse at lunch, the airport monitor that shows your departure gate, the hotel bill that itemizes your charges: tables are the boats that keep us afloat in a sea of facts and figures.

A table presents information in a structured, row-and-column format that makes it easy to compare sets of data: How do the second quarter's figures compare with the first quarter's? How are the Giants doing compared with the Braves? How do Apple's laser printers compare with Hewlett-Packard's?

A table can also be a road map that helps you find the articles in a magazine or the chapters in a book, or a way to present parallel information—for example, the TV listings might put ABC in row 1, NBC in row 2, and CBS in row 3.

You might not think that your quarterly P&L statements have much in common with a TV schedule, but both share the same basic components: headings that identify columns; a stub, the table's leftmost column, where subjects or categories are identified; and the field, or body, which contains the bulk of the table's contents.

Table Tools

Word processors and spreadsheet programs each bring their own strengths to creating tables.

A spreadsheet's row-and-column orientation makes it an ideal table editor. (*Macworld*'s product-comparison and benchmark tables begin life as Microsoft Excel spreadsheets.) There's no initial setup: just start typing headings and data, and then resize column widths as needed to accommodate the largest entry in each column. (Most spreadsheet programs can do this for you: in the heading area, double-click on the line separating a column from its neighbor to the right.) You can use the spreadsheet's border and shading features to dress up the table, and you can copy the finished product into a word processor or other program. More on these matters later.

Although a spreadsheet is a natural table editor, word processors provide better text-formatting options, and their style-sheet features let you automate repetitive formatting—of which there is plenty in a table. And the table-editing features most word slingers provide make creating a table almost as easy as in a spreadsheet program.



Tabs versus Table Editors

Microsoft Word (5.0 and 6.0), WordPerfect, Claris's MacWrite Pro, and WordStar's new WriteNow 4.0 allow you to create a table in either of two ways: by using typewriter-like tab stops or by using a built-in table editor. You can even use both techniques in the same table to combine the strengths of each.

What are those strengths? For starters, tabs have the edge when it comes to formatting flexibility. Want to align the decimal points in a column of numbers? Create a decimal tab. Want to guide the readers' eyes across from one column to another? Create a leader tab.

Tabs are also preferable if you plan to move a finished table into another program, such as Aldus PageMaker. Although all publishing programs can read documents created with most word processors, they can't import tables created in the word processors' table editors. This trade deficit can even occur between two word processors: WordPerfect can open tables in Word documents, for instance, but you may encounter formatting problems such as lost cell borders or disrupted alignment.

One big drawback of tabs is that they can be confusing to set and adjust. Tabs, like line spacing and indent settings, are paragraph-level formatting attributes; in most tables, every line ends with a carriage return, which makes it a separate paragraph. Hence, the First Commandment of Table Editing: Before adjusting tabs, select the lines you want to affect.

The other big tab drawback surfaces with table entries that are more than one line deep. You must divide such entries across multiple lines playing a tedious game of hopscotch between the tab and return keys, and editing or reformatting a multiline entry is cumbersome.

Table Editors to the Rescue

Table-editing features eliminate these hassles by providing a spreadsheetlike grid of cells that hold the table. Just specify how many columns you want and start typing; the program adds rows as you go. Words wrap inside cells, so typing multiline entries is a cinch: when a cell's contents spill onto subsequent lines, the

continues

whole row grows taller to accommodate them. Besides text, a cell can contain a graphic imported from another program. In MacWrite Pro, a cell can even contain another table.

Adjusting column widths is also easier with a table editor. Instead of dragging tab stops left and right on a ruler, you use the same resizing technique that spreadsheet programs provide: just drag the vertical line that separates two columns. (In Microsoft Word 5's table editor, resizing isn't quite as easy—you select the cell, row, or column to be resized, and then drag a ruler marker left or right. The table editor in Word 6, due to ship in May, matches the competition's and bests them in some areas.)

Table editors are like spreadsheets in other ways. You can create borders and shade cells to highlight key information or separate each row or column. In WordPerfect and Word 6, you can create simple formulas that calculate the values in a row or column to display a total or an average. In MacWrite Pro, WordPerfect, and versions 5 and 6 of Word, you can sort a table according to the contents of a given row or column—just the ticket for organizing those sports standings.

Who has the best table editor? At this writing, WordPerfect 3: its math-calculation features outdo the rest, and formatting cells is easier than with Word 5, the second-place contender. WordPerfect is also the only program that lets you specify that a set of column headings repeat on each page, a must for multipage tables. Word 6 will have a similar feature.

MacWrite Pro's table editor has one edge on the rest—you can change a table's location on the page by simply dragging it—but otherwise, it's a relative lightweight. It can't create multipage tables, for instance, and it doesn't do math.

Top Table Tips

Use these techniques to produce tables that are clean, attractive, and easy to read.

Consolidated Global Industries
1993 Sales (in $U.S. millions)

Division	United States 1993	United States Change, 1992–1993	Europe 1993	Europe Change, 1992–1993	Japan 1993	Japan Change, 1992–1993
Construction	$ 4,750	17.9%	$ 883	(24.2%)	$ 14,380	14.6%
Government Services	8,773	73.7	3,211	29.3	0	0
Mining	1,668	(14.5)	1,844	87.2	0	0
Transportation	2,795	4.3	5,290	39.9	4,555	5.2*
Total	**$17,986**	**38.1%**	**$11,228**	**33.5%**	**$18,935**	**12.2%**

*July–December only (CGI's Japan Transport opened July 1992).

1) Left-align the heading over the stub (the list of categories in the left-most column).
2) Terminate the rule that divides heads and subheads where the headings end.
3) Center-align heads that straddle more than one column subhead.
4) Indicate ranges with an en dash (option-hyphen), not an em dash or a hyphen.
5) Use dollar signs, percent signs, and other symbols only on first and last rows. Align symbols in top row with symbols in bottom row.
6) Align single- and multiple-line heads along the bottom line of the multiline heads' type.
7) Put negative numbers in parentheses—don't use a minus sign.
8) Use decimal tabs so that all numbers align at the decimal point.
9) Choose a footnote style to avoid footnotes being read as data—for example, don't use numbers to footnote numbers.

Keeping the Eyes on Track

The aesthetic concerns behind table formatting are the same regardless of the tools you use. The most important aspect of table legibility involves guiding the readers' eyes from left to right along each row. We read horizontally, from left to right—tables, with their strong vertical columns, disrupt this flow.

Typographers and designers rely on a bag of visual tricks to keep the eye on the right track. One common device is the leader tab, in which a row of periods, or leader dots, guides the eye from one column to the next. Leaders are most commonly used between a table's stub (its left-most column) and the column to its right—that's usually where the largest gap of white space is. "Top Table Tips" illustrates this approach.

A more contemporary variation (and one used in *Macworld*'s tables) is to put a horizontal line, or rule, between each row of the table. This is particularly easy to do in a spreadsheet or in a word processor's table editor: use the Cell Borders command and specify a horizontal border above and below each row. Don't make the rules too heavy—a thin, hairline rule will usually do—and be sure the contents of each row are vertically centered between their surrounding rules. Use a heavier rule between the table headings and the first row. (By the way, if the flow of your table is vertical rather than horizontal—perhaps it contains parallel paragraphs in different languages—you might put a rule between columns instead of between rows.)

Yet another variation: shade every other row of a table. The border-and-shading options in spreadsheet programs and word processors make this easy. Use a very light shade—say, 10 percent—lest the shading obscure the text beneath it. If you're printing the final table on a 300-dots-per-inch printer, think twice about shading; on a 300-dpi printer, even 10 percent gray can be too dark.

Lining Things Up

One thing that makes tables so tidy is that the contents of each column are aligned. Or at least they should be. Many table neophytes simply use their programs' left-align presets, thus snubbing centuries of typographic tradition. Here's how to do it correctly. ("Top Table Tips" illustrates the following rules.)

In a column of related numbers, decimal points must align. Use a decimal tab or, in WordPerfect 3's table editor, the Decimal Align option on the Layout bar.

If the numbers are monetary values, put a currency sign before the first and last rows' value only—don't repeat the sign in every row. The currency sign must align with the largest value in the column, even if that means putting extra space between the sign and the number following it. (An easy way to do this is to type as many zeros as you need to push the currency symbol to the left, and then change the zeros' color to white—they'll disappear.) By the way, never use a lowercase *l* or a capital *I* instead of the numeral 1, or a capital *O* instead of the numeral 0. Doing so will misalign columns of numbers and cause legions of deceased typographers to spin in their graves.

Some of the formatting gymnastics I've just described may require you to combine traditional tabs with a table editor. Say you want leader dots across the first column of a table that you're creating with a table editor. Using your program's on-screen ruler, put a leader tab near the right edge of the first column (see "Using Tabs in Tables"). To create the leader dots in MacWrite, Word, or WriteNow, type the first column's information and then press option-tab (use ⌘-tab in WordPerfect).

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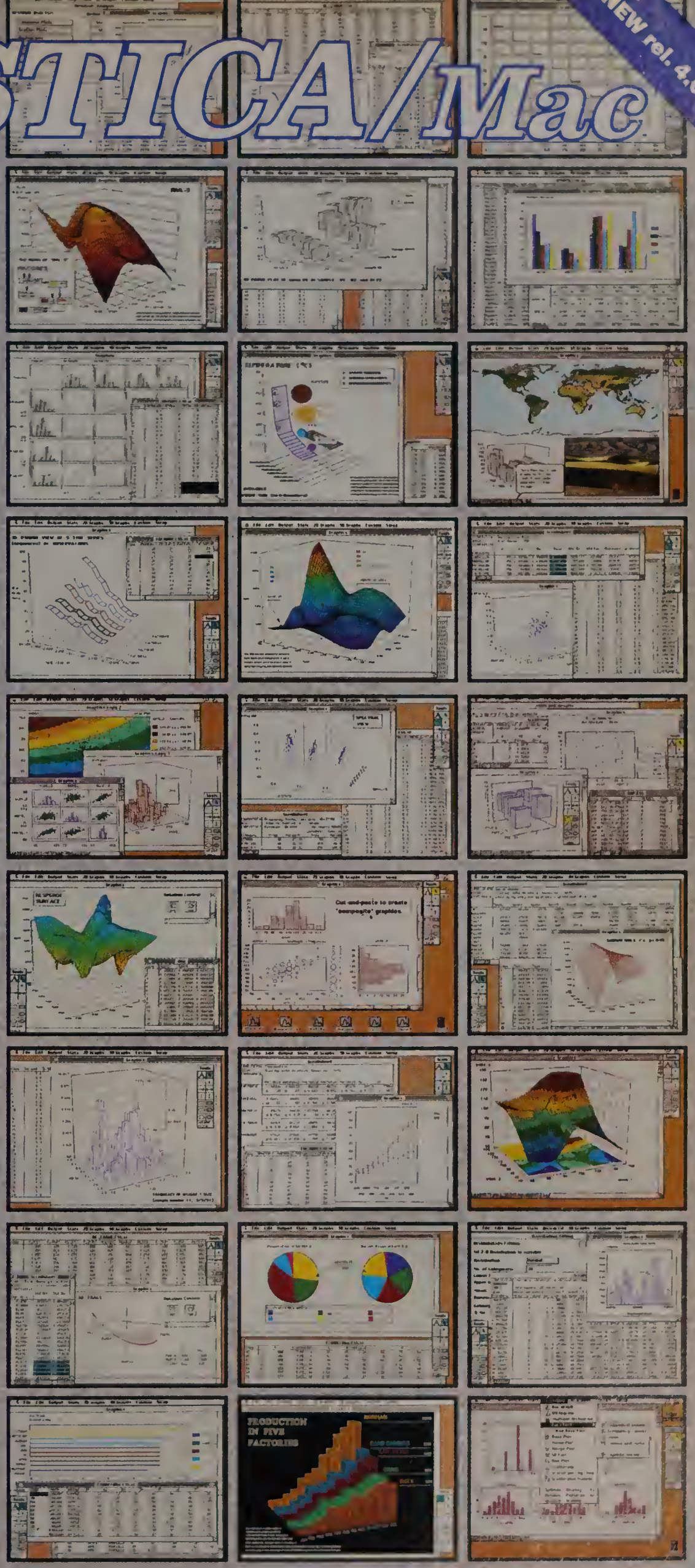
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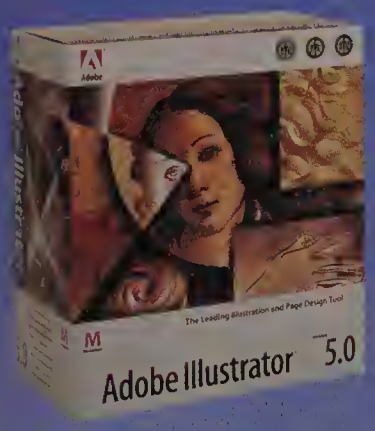
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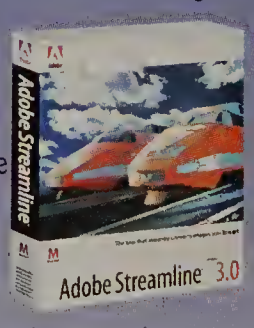
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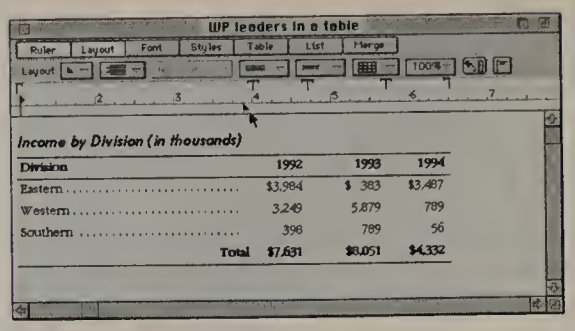
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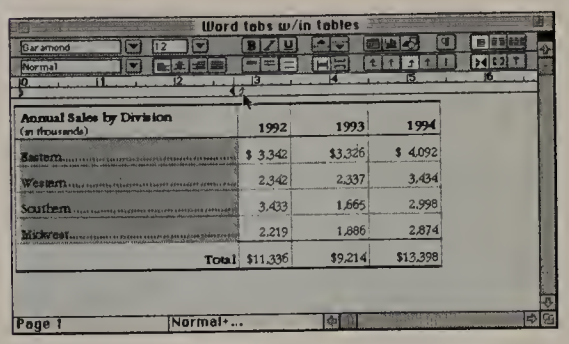
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Using Tabs in Tables You can combine tabs with a table editor to get the strengths of each. Top: A leader tab in a WordPerfect table. Bottom: A similar tab in Microsoft Word. In the Word table, I have dragged the tab to the right of the column's right margin to extend the leader dots to the edge of the column.

Headings in the Right Direction

Column headings are traditionally centered above their columns. This one isn't carved in stone, though; many designers prefer to left-align headings (particularly above text-heavy columns), or to right-align headings over numeric columns. If there's a heading over the stub, always align it left.

Avoid putting long headings on one line. If headings are considerably longer than the columns below them, there will be too much white space between each column, and your readers' eyes will need a trapeze to swing from one column to the next. Break long headings into two or more lines to create a narrower column, and format the headings vertically so that they align across their bottom lines. Don't worry about filling all the space between the page's left and right margins. There's nothing wrong with a table that goes across only part of a page; on the contrary, a table that's narrower than the margins stands out more and can enliven the page. (On a page containing several narrow text columns, try formatting the table so that it spans two or more columns.)

Column widths are also influenced by the font and type size you use. If you have a lot of information to squeeze into each row, use a space-efficient typeface such as Times or Helvetica Condensed—don't shrink the point size to near-invisible proportions.

Transporting Tables

I've already mentioned that tables created with a table editor are more difficult to export than tables created with tabs. If you want to move an elaborately formatted table from Excel or Word into another program, there is one technique you can use: copy it as a picture.

Word and Excel let you copy any text as a picture, which you can then paste into another program. In Word, select the entire table by pressing option and double-clicking anywhere within it, and then press ⌘-option-D. In Excel, select the table and press the shift key while opening the Edit menu—note the Copy command reads Copy Picture. Choose Copy Picture, then choose the As Shown When Printed button in the subsequent dialog box. Now switch to the destination program and paste. To edit or reformat the table, you have to return to your Word or Excel document and repeat the copy-as-picture routine to replace the table with the latest version.

Generally, if a table's final destination will be a publishing program, I recommend doing the majority of your formatting using the publishing program; otherwise, you have to redo any formatting that your publishing program discarded when you import the table. If you use QuarkXPress, there's another alternative to table-importing headaches: create tables within QuarkXPress using Npath's Tableworks Plus, an extension that adds a table editor to QuarkXPress. Tableworks Plus can also import text-only files into tables. m

Next month: LaserWriter Power for Business

WHERE TO BUY

MacWrite Pro 1.5 $249; Claris Corporation; 408/727-8227, 800/325-2747.

Microsoft Word 5.1a $495; Microsoft Corporation; 206/882-8080, 800/426-9400.

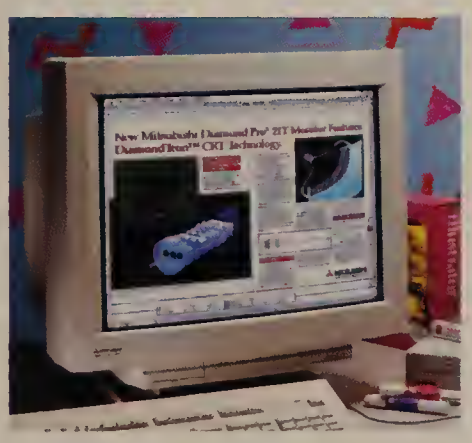
TableWorks Plus 1.06 $349; Npath; 206/392-7745.

WordPerfect for Macintosh 3.0 $495; WordPerfect Corporation; 801/225-5000, 800/451-5151.

WriteNow 4.0 $119.95; WordStar International; 415/382-8000, 800/227-5609.

Contributing editor JIM HEID is the author of *Macworld Complete Mac Handbook Plus CD* (IDG Books Worldwide, 1993). His newest book, *Macworld Word Companion Special Edition* (IDG Books Worldwide), a hands-on guide to Microsoft Word 6, will be available when Word 6 ships.

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Smart Think

EIGHT PROGRAMS THAT HELP YOU THINK CREATIVELY AND PLAN

Page through any software catalog and you'll encounter a dizzying number of tools for charting, graphing, writing, and presenting your ideas on the Mac. But let's face it: presentation—even with the most spectacular software at your disposal—is still only half the formula. At the core of the most persuasive presentations and successful projects are great ideas—and you can't buy those on floppy disks.

Or can you? Welcome to the world of idea generation and development, where you focus on forming ideas. What follows is a look at some unusual tools you can use to fire up your creativity, hatch new thoughts, and gradually organize a collection of preliminary ideas into a cohesive plan—anything from a new product concept to a complex business proposal.

The Art of Brainstorming

Being creative on demand is never particularly easy—and when you're feeling blocked, the challenge can seem insurmountable. If your creative juices need stirring, consider a thought-provoking session with MindLink Problem Solver or IdeaFisher. Both brainstorming programs encourage you to look at familiar ideas from a different angle, and both programs suggest links between related words and ideas. But while IdeaFisher encourages a freewheeling, serendipitous approach to idea generation, MindLink offers more structured guidance and coaching.

IdeaFisher is the more impressive of the two tools. It is built around a sprawling database called the IdeaBank, which contains more than 60,000 words organized by major categories (such as Animals, The Senses, and Emotions) and topical categories (groups of related concepts such as jump/spring/bounce/deflect/reflect or wild/fierce/uncivilized/tame/domesticated). All entries in the IdeaBank are cross-referenced by concept and association. You can engage in free association, jumping from one related word or phrase to the next, and IdeaFisher automatically records your findings on the Idea Notepad. When you're done idea-hopping, you can export the contents of your Idea Notepad as a text file. The program also allows you to generate new ideas based on combinations of words; type in any two words, and IdeaFisher creates a list of people, animals, verbs, adjectives, and phrases that are all somehow associated with that word combination.

Sometimes using the IdeaBank works and sometimes it doesn't; but in general, I found the rich supply of interconnected ideas enjoyable and effective in stimulating new ideas. You can also turn to IdeaFisher's QBank—a collection of more than 5000 questions that help you probe and evaluate ideas and flesh them out. IdeaFisher extracts the key ideas from your responses to the QBank's questions by collecting a list of all the words you use repeatedly in answering the questions. IdeaFisher Systems also offers three plug-in QBank modules, one for creating a mission statement and producing long-range plans; one for preparing grant proposals; and one to assist in creating speeches, lectures, and other presentations.

MindLink Problem Solver offers a more structured approach to brainstorming. You type in a problem or challenge, and the program—actually a HyperCard stack—presents questions and exercises that help you examine the problem from different angles.

From the moment you open the box, it's clear that MindLink takes an unconventional approach. Along with the software and manual, you get a small bag containing, among other things, a tiny toy truck and a wooden pimento-stuffed olive. You're supposed to keep these items on hand as you use the program to stimulate your imagination.

Wooden olive in hand, I launched MindLink feeling somewhat skeptical. Nevertheless, I found the exercises helpful in articulating a problem and developing solutions. True, you may feel kind of wacky following the program's suggestion that you examine a gnarly business problem from the point of view of, say, a butcher (unless, of course, you are a butcher), but if you stick with it, these techniques really do prod you into reviewing situations from new angles and dreaming up solutions. As with IdeaFisher, you can save your responses to MindLink's questions as a text file for use in other applications.

On the downside, MindLink has the unimpressive, somewhat amateurish look of so many HyperCard stacks; its lackluster black-and-white interface feels a bit crude and clumsy, and the stack behaves unpredictably at times.

Thinking on a Blank Canvas

For those who don't need to contemplate a bag of toys or search a database to feel a creative spark, Inspiration provides a less formal, more open-ended brainstorming tool. Inspiration doesn't prompt you with probing questions or hypothetical scenarios; it simply provides a blank canvas on

ing

EFFECTIVELY



which you can quickly record and arrange ideas as they occur to you.

Inspiration's diagram mode allows you to take a visual approach to organizing your thoughts. Each idea you type gets inserted into its own symbol box (see "Inspiration's Mind Map"). You can change the relationship between ideas by simply dragging the symbols on screen, and you can connect related ideas by dragging links between them to create a graphical map of your ideas. Visually clustering the idea symbols on screen allows you to see emerging relationships, thought patterns, and themes.

The program also has a strong outline mode for translating your idea map into a traditional hierarchical outline (more on Inspiration's outlining features below). At any time you can jump back to the diagram view, where you can use a palette of standard drawing tools to enhance your idea map before printing it.

Chena Software's Fair Witness, while not primarily a brainstorming tool, also has a free-form mode that can be helpful for working with embryonic ideas. You can type ideas anywhere on the free-form view's blank page, using the screen like an electronic whiteboard. And once you've typed them, you can drag the ideas around as much as you want, placing them in rows, columns, or clusters as the humor strikes you. The idea is to jot down thoughts as they occur to you—and worry about categorizing and arranging them later, using the program's superb outlining tools (more on this outstanding outliner/organizer below).

A new entry in the free-form outliner market is Corkboard from MacToolkit.

by Joseph Schorr

Billed as a graphical outliner, Corkboard is built on the old index-card model; you record each idea on a separate electronic index card that you stick up on a corkboard-covered screen (the cards can also hold graphics and QuickTime movies). You can drag the cards around and stack them, create categories and assign them to cards, and clump related cards together; it's a lot like working with a real packet of cards.



MANUELLO PAGANELLI

Inspiration fan Chic Thompson (right) of Creative Management Group, in Charlottesville, Virginia, has worked with Robert Collins, CEO of GE Fanuc Automation, also in Charlottesville, to streamline GE Fanuc's manufacturing and management processes. Since the 10-year project got under way, the plant, which designs and manufactures programmable logic controllers, has won several awards including *Industry Week*'s 1992 America's Best Plants award.

You can also turn your card-filled corkboard into a conventional outline. Corkboard's outline mode makes it easy to nest related points and assign each level of the outline a unique style. Items given a hierarchy in the outline view are linked tree-chart–style when you switch back to the graphical corkboard view. But the graphical corkboard approach is more of a novelty than anything else; Fair Witness, Inspiration, and Symantec's More are all far more powerful programs.

Developing Your Plan

OK, now you know your overarching goals and objectives, but you need to figure out how you're going to implement your plan. You have to home in on the details, set priorities, and decide what your next steps will be.

It's time to make lists. Of course, even the most basic word processor suffices for typing a simple text list, but a program with true outlining capabilities makes this kind of organizational task much easier. (Some word processors double as outliners—see the sidebar, "Thinking Tools You Already Have.") An outliner lets you reorder and prioritize items simply by dragging them into position—no cutting and pasting required. And instead of scrolling through pages of text, you can collapse and expand subpoints to zero in on precisely the information you need.

Outlining and organizational tools range from the supersimple to the elaborate. On the low end is Portfolio Software's DynoNotePad, a no-frills outliner that handles all the tasks described in the previous paragraph, but little else. DynoNotePad has a few neat features—phone-number dialing and the ability to record sounds directly into an outline entry, for example—but otherwise it's too utilitarian to justify its price of $59.95. Its formatting features are more limited than most outliners', too; there's no text ruler, and you can't set up global text formats for levels of the outline.

A far more powerful outliner/organizer is Symantec's More, which enables you to arrange ideas in an outline and then display them as a tree chart or as a series of bullet charts (which can also be printed for handouts or displayed in an on-screen presentation). More has a rich

Quick Guide to Thinking Tools

	IDEA-GENERATION TOOLS		ORGANIZING TOOLS			
	IdeaFisher 2.0	MindLink Problem Solver 2.2	Corkboard 1.5	DynoNotePad 1.0	Inspiration 4.0d	More 3.1
General						
List price	$199 [A]	$295	$149	$59.95	$295	$395
Company	IdeaFisher Systems	MindLink Software	MacToolkit	Portfolio Software	Inspiration Software	Symantec Corp.
Phone	714/474-8111	802/457-2025	310/395-4242	802/434-4000	503/245-9011	503/334-6054
Toll-free phone	800/289-4332	800/253-1844	○	800/729-3966	800/877-4292	800/441-7234
Imports text files	NA	NA	●	●	○	●
Exports text files	●	●	●	●	●	●
Formats directly supported (open files, save files)	text [B]	text [B]	Word (outline view saved in RTF)	Acta, MacWrite, More, RTF, ThinkTank, WriteNow	MacWrite, More, ThinkTank,Word, WordPerfect [B]	MacWrite, TeachText, ThinkTank, Word, WordPerfect, WriteNow
Views	NA	NA	outline, free-form, tree-chart	outline	outline, free-form, tree-chart	outline, tree-chart, graph, slide-show
Brainstorming and Outlining						
Guides idea development	●	●	NA	NA	NA	NA
Suggests links between words, phrases	●	○	NA	NA	NA	NA
Maximum subtopic levels	NA	NA	unlimited	999	99	unlimited
Custom outline labels	NA	NA	○	●	●	●
Assigns styles by outline level	NA	NA	●	○	●	●
Performs calculations	NA	NA	○	○	● [C]	● [C]

● = *yes;* ○ = *no; NA = not applicable.* [A] *Strategic Planning Module $99; Presentation Module $79; Business and Grant Proposals Module $99.* [B] *Save only.* [C] *Only does addition.*

set of features, but be aware that Symantec has decided against upgrading and supporting the product in the future.

Outlining with More is quite easy. You can quickly promote and demote entries in an outline using the tab key, and you can focus on one portion of an outline with the Hoist command, which jumps a topic to the top of the window and temporarily hides all other topics in the outline. The program's Clone command lets you view a topic in more than one place in an outline, and the Mark and Gather commands let you select several subtopics in different places in the outline and move or clone them in one stroke. More also has a built-in calculation function: if a series of subpoints in an outline contains numeric data, More can total the numbers and place the sum in the heading above the subpoints. Also outstanding is a Calendar command that lets you quickly generate organizer-type calendars within your outline.

Formatting features are also plentiful. The Rules dialog box allows you to set up styles for each level of the outline, and there's a text ruler for setting tabs, spacing, margins, and justification, so you can turn out a polished-looking document when your outline is complete.

More also provides tools for presenting your ideas after you've organized them. More Graph—a separate application that comes with the package—can turn out impressive charts and graphs, and the program's slide-show feature is quite impressive.

Like Inspiration, More does a fine job displaying hierarchical outlines as tree charts, but More's tree charts are more rigidly structured than Inspiration's: with More, you can't use curved lines to connect related symbols, you can't drag symbols on screen, and you can't add new information in tree-chart view (see "Two Views of More"). For organizing in tree-chart style, Inspiration is the more flexible, creative tool.

For text-based outlining, the two programs are comparable. Inspiration's outliner allows you to reorder topics easily and attach notes to topics. For an overview of your work, you can collapse or expand portions of the outline, and the Focus In command is equivalent to More's Hoist command. Inspiration's biggest problem is that it can't import text from any other programs (though it can export in five formats). More, however, supports a wide range of popular word processors.

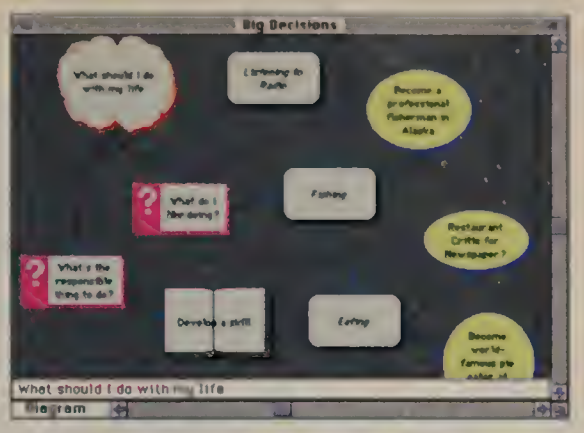
Adding the Details

As a plan develops, setting deadlines becomes an important concern—and that means linking your outline to a calendar of some sort. Attain's In Control is a to-do-list manager that, like most outliners, allows you to set up a hierarchy of main headings and subpoints that can be expanded and collapsed as desired. But unlike most outliners, In Control also has clock and calendar functions. You can link outline items to specific dates and times by dragging the items to the appropriate day on the calendar, and you can set alarms to notify yourself of impending deadlines (see "Outliner/Calendar").

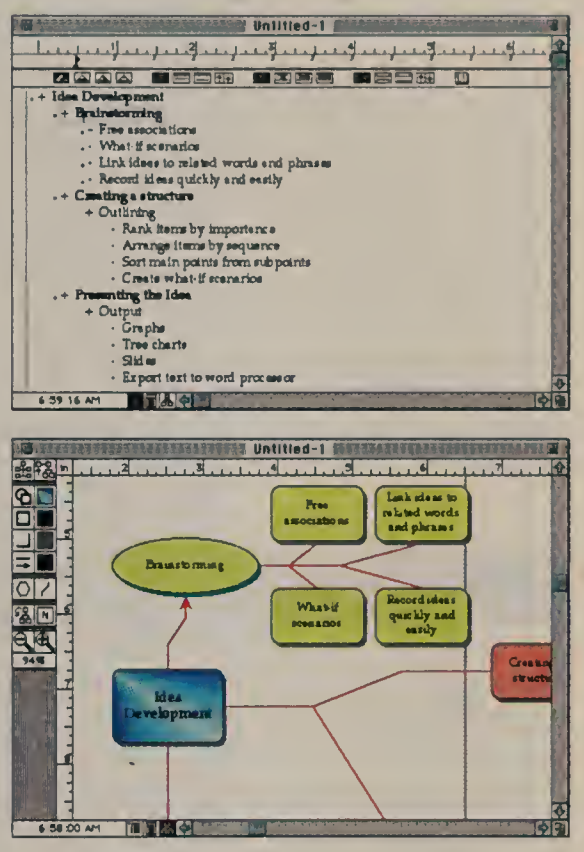
Even without its calendar functions, In Control holds its own as a full-featured outliner. Most notably, it allows you to set up columns for information related to each outline topic, such as projects or people. With a single click you can sort your outline by any column. And In Control is the only program discussed here that allows you to automate searches by saving specific sets of search criteria.

Fair Witness is even more flexible as an organizing tool than the other products; it has such a broad range of capabilities (outliner, calendar, spreadsheet, database) that it defies simple categorization.

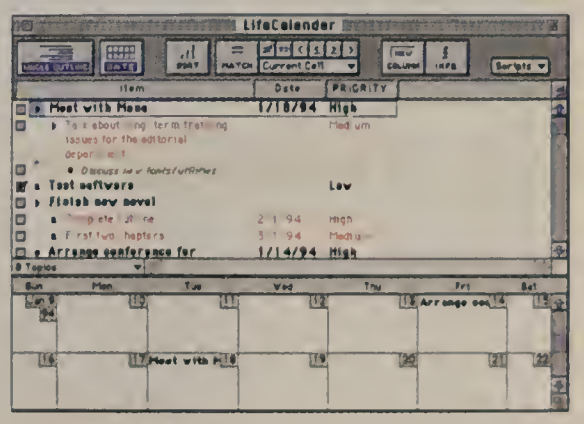
Fair Witness organizes your data in a matrix of cells resembling a spreadsheet. The first column of the spreadsheet contains your basic ideas (called the primary text) in traditional outline form. As with the other programs, you can sort through your ideas and nest them as subtopics.



Inspiration's Mind Map Inspiration allows you to record ideas in a free-form diagram. You can assign any symbol a custom shape, color, and style; drag it into a new position; and link it to any other ideas on the screen.



Two Views of More In More, projects begin as simple text-based outlines (top), with subtopics nested below main ideas. You can instantly transform the outline into a tree chart, though More does not allow you to add new subpoints in tree-chart view.

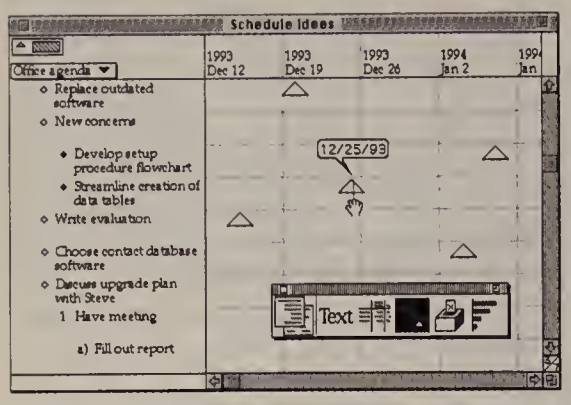


Outliner/Calendar In Control is part organizer, part calendar, and part outliner. You can link topics and subtopics to dates by dragging them to the calendar portion of the screen; here, a meeting with Mona has just been scheduled for 1/18/94

You use the remaining columns—which can be hidden, resized, and renamed as you desire—to hold other information connected with each idea: dates, times, numbers, pictures, and so on.

IMPLEMENTATION TOOLS

Fair Witness 1.2.1	In Control 2.0
$295	$129.95
Chena Software	Attain Corp.
610/770-1210	617/776-1110
800/245-4577	800/925-5615
●	●
●	●
none	MacWrite, More
outline, free-form, graph, time-line	outline, calendar
NA	NA
NA	NA
unlimited	unlimited
○	○
○	●
●	○



Beyond Outlining In Fair Witness, the hierarchical outline at left is just one piece of your information matrix. You can link topics to dates, pictures, and other information in a row-and-column grid and, as shown here, dates can be displayed on a time line.

In this regard, Fair Witness is similar to In Control. But the real strength of Fair Witness lies in the different ways you can view and print your information. The Time Chart view, for example, displays dates from your outline on a graphical time line, a feature none of the other reviewed programs have. (Fair Witness cannot, however, display data in a true calendar format, as In Control can—see "Beyond Outlining.") The Ratings view allows you to rank ideas by preference or priority. The Graphs view shows your rankings as a bar graph or pie chart.

Fair Witness can also do math, providing 12 different calculations including average, standard deviation, and geometric mean. Moreover, you can set up custom formulas that calculate numbers across columns.

As for the task of organizing your ideas, Fair Witness offers a top-notch categorizing tool. Suppose you've jotted down a series of ideas in list form—no particular order or priority. The Categorize feature lets you turn each main topic into a separate tile along a bar at the bottom of the window. To turn another idea into a subpoint of a topic, you just drag the idea to a main topic tile, and the subpoint automatically jumps into its proper position in the outline. It's a painless and intuitive way to start organizing a mass of information into a logical order.

(Too late to cover in this article, we learned of plans to upgrade Fair Witness and rename it InfoDepot 2.0. The new incarnation should ship in February with a more polished interface, style sheets, and extensive support for Apple events for exchanging information with other programs such as Microsoft Excel and Now Software's Now Up-to-Date.)

Got the Idea?

Each of the products described here is unique. Which of them you'll find most useful depends largely on your own brainstorming style. If your imagination needs a jump start, mind-jarring programs like IdeaFisher and MindLink may fit the bill; other minds may chafe under the firm mental prodding these programs provide. If you're just looking for a quick way to record and arrange your ideas, more open-ended programs like Inspiration or Fair Witness will probably serve you best.

Of course, none of these programs actually make you more creative, and they certainly can't make decisions for you. But the best of them can make it easier to sort through a jumble of ideas and hammer them into a workable plan—maybe even a great plan. **m**

JOSEPH SCHORR is coauthor of *Macworld Macintosh Secrets* (IDG Books Worldwide, 1993).

THINKING TOOLS YOU ALREADY HAVE

You may already own an outliner. Many word processors such as Microsoft Word—and even integrated programs such as ClarisWorks—have an outliner built in, and there are some real advantages to tapping into your word processor's outlining. For one thing, high-powered products like Word actually offer more features than some low-cost stand-alone outliners. And when you use your word processor to outline, you don't have to worry about moving files between programs: your final outline is already in your word processor's native format.

Microsoft Word Word has the best of the outliners within a word processor. When you enter the often-ignored Outline view, a special tool bar appears across the top of the screen, with buttons for creating a hierarchical outline and expanding or collapsing subtopics to any level desired.

An abundance of keyboard shortcuts makes quick work of promoting and demoting paragraphs (you can also promote or demote a paragraph by dragging it to the left or right), and you can move topics with their nested subtopics by dragging and dropping them into a new position. Formatting is easy: you can use Word's style sheets to format each level of the outline.

When your outline is complete, you can switch back to Word's Normal view, and each topic or subtopic will appear as a separate paragraph. Word can even generate a table of contents based on the topics in the outline. (Word 5.1, $495; Microsoft Corporation, 206/882-8080.)

WordPerfect WordPerfect's outlining is much more limited. It supports automatic numbering (or lettering) of nested paragraphs, but it doesn't allow you to collapse or expand the outline to control how many levels are visible; nor can you drag outline entries up or down—one of the important functions of any outliner. Nesting subtopics is a cumbersome process because each new paragraph is inserted on the outline's highest level, so you have to manually demote each new subtopic to the level you want. In fact, WordPerfect's outliner is less of an outliner than it is an automatic paragraph-numbering system. (WordPerfect 3.0, $495; WordPerfect Corporation, 801/225-5000.)

ClarisWorks Surprisingly, ClarisWorks, though equipped with relatively bare-bones word processing, has a great built-in outliner. Like Word, ClarisWorks allows you to selectively collapse and expand outline topics; drag topics and related subtopics up or down within the outline; and promote and demote items with keyboard shortcuts. On the downside, the program provides no visual clue as to which topics contain collapsed subtopics and which don't. ClarisWorks offers 7 stock outline formats and 11 label types—letters, numbers, Roman numerals, bullets, check boxes, and so on. (ClarisWorks 2.0v1, $299; Claris Corporation, 408/727-8227, 800/325-2747.)

GreatWorks Symantec's GreatWorks, another integrated program, also offers a respectable outliner. With GreatWorks you can drag topics to reorder them or change their hierarchy, and you can expand or collapse portions of the outline. The program offers six preset outline formats (including Legal, Numeric, and Bullets) and allows you to define text attributes to apply automatically to any topic at a given level. (GreatWorks 2.0.1, $129.95; Symantec Corporation, 408/253-9600, 800/441-7234.)

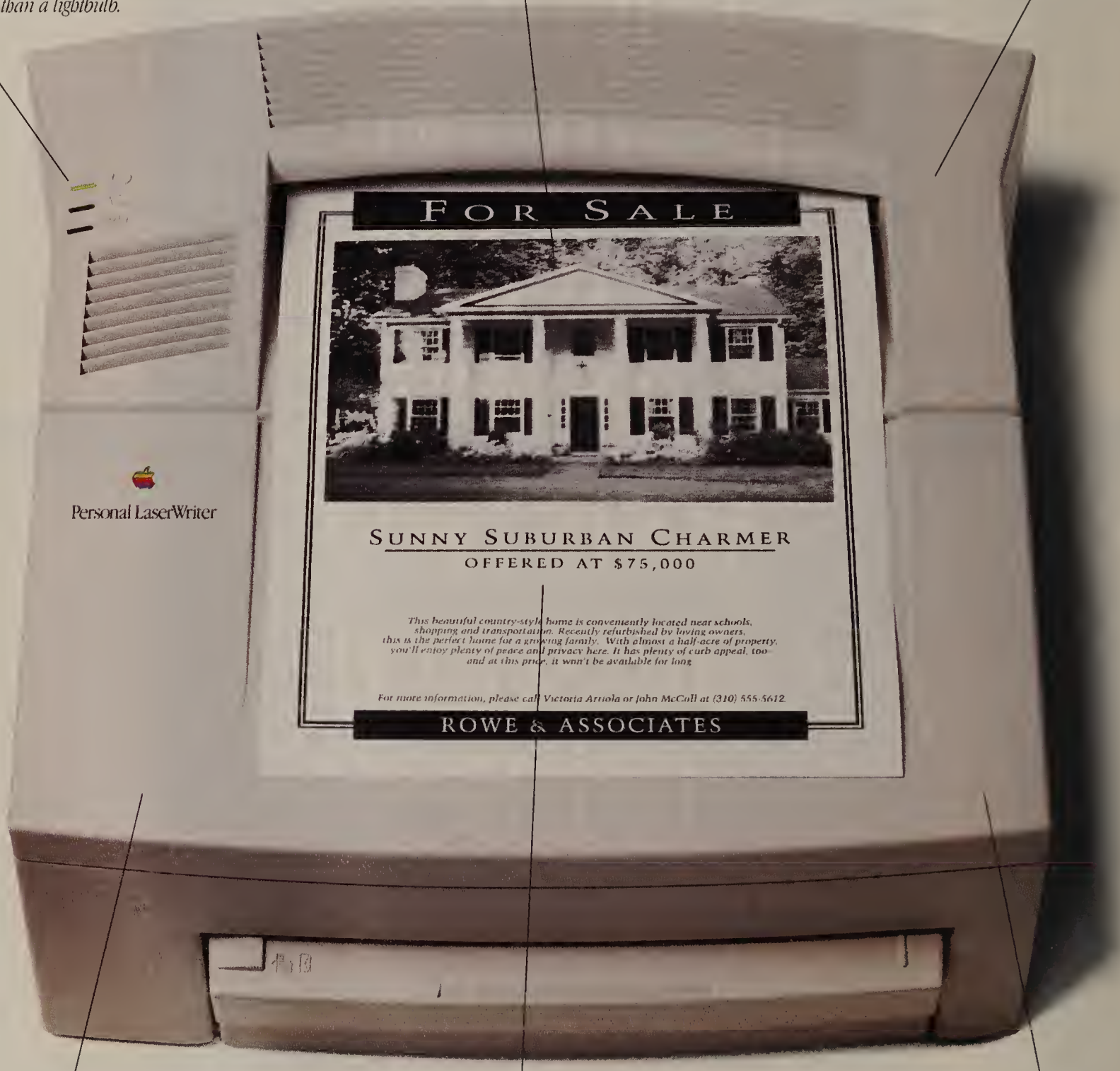
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Circle 79 on reader service card



BY LON POOLE

Quick Tips

Tips, Tricks, and Shortcuts

HOLDING DOWN THE SHIFT KEY WHILE starting up your Mac turns off all system extensions, as you know if you read February's *Quick Tips*. But with many non-Apple keyboards, a slight variation of this trick is required, according to Lloyd Loring via CompuServe. If pressing the shift key the instant you hear the start-up chime elicits the "Welcome to Macintosh" message without the expected addendum "Extensions Off," try this. Wait until the smiling Macintosh icon appears and then hold down the shift key until you see the message "Welcome to Macintosh. Extensions Off."

Easy Rebuilding

Can you remember how to rebuild the Finder's desktop database on your hard drive? (The answer is in April's *Quick Tips*.) Danny Wong of Toronto discovered a simple method that not only doesn't require remembering an arcane keystroke combination but also avoids the irksome dialog box that asks you to confirm rebuilding the desktop, which is especially a pain if you are rebuilding multiple volumes. In the window of a disk whose desktop you want to rebuild, create a new folder and name it Desktop. The next time you start up your Mac, the Finder immediately rebuilds this disk's desktop with no questions asked. When rebuilding is done, be sure to drag the Desktop folder you created to the Trash so it doesn't trigger another rebuilding at the next restart. This method works on multiple volumes (by putting a new folder named Desktop at the root level of each volume you want rebuilt) and with removable disk cartridges, but Wong found that it doesn't work on floppy disks.

I figure Wong's method works because the System 7 Finder is incorrectly identifying the folder named Desktop as a System 6 desktop database (which would actually be stored in an invisible file named Desktop) and therefore is wrongly assuming that the volume was last used with System 6. The System 7 Finder automatically rebuilds the System 7 desktop database (stored in two invisible files named Desktop DB and Desktop DF) on any volume larger than 2MB that the Finder assumes was used with System 6, in case any changes were made then. None of this applies to any volumes under 2MB, such as floppy disks, because System 7 uses the System 6 desktop database for them, rather than the two-file System 7 desktop database. In fact, you cannot name an item Desktop on a floppy disk because it contains an invisible file already using that name.



Automatic Fax Printing

Q. We want to receive all faxes through our fax modem and store them on optical disks. However, we must be sure all incoming faxes that are received after hours are printed immediately to prevent the loss of faxes in case our system breaks down during the night. Also, by printing faxes at night, we would avoid tying up our equipment during work hours. Unfortunately, our Faxstf software has no option for automatic printing. Can you recommend a solution?

Klaus D. Lange
Caracas, Venezuela

A. You will have to switch to different software, such as Delrina's FaxPro for Macintosh (408/363-2345, 800/268-6082). Although FaxPro can send and receive faxes in the background, its automatic printing option works only in the foreground. While automatic printing is on, you cannot use other applications. Delrina FaxPro sells for about $90 by mail order, but your Faxstf serial number qualifies you for a $45 competitive upgrade (see *Reviews*, *Macworld*, February 1994, for a closer look at Delrina FaxPro). The Global Fax software that comes with the top-notch TelePort and PowerPort fax modems from Global Village Communication (415/390-8379, 800/736-4821) can automatically print faxes in the background. Since Global Fax software is not sold separately, you'd have to replace your modem to get it.

Unwanted Dates

Q. Why does Microsoft Excel interpret entries that contain slash marks as dates? For example, Excel converts 1-1/2 to January 1, 1902.

Gene T. Pretzer
Clinton Township, Mississippi

continues

A. Excel does this to protect you from the hideous truth that it, like other spreadsheet programs, stores dates and times internally as serial numbers. When you enter numbers separated by slashes or dashes, Excel interprets the entry as a date, stores that date's serial number, and changes the cell's format from General to a date format. For detailed information, look up entering dates and times in the Excel manual.

If you want to enter a nondecimal fraction in a cell with the General format, you must enter an integer and put a space between the integer part and the fraction part (for example, **1 1/2**). A fraction (such as ½) without an integer part must be prefixed with a 0 and a space (**0 1/2**).

Upgrade or Replace?

Q. I have an SE/30 with 5MB of RAM and a 40MB hard drive. I want a bigger (and color) monitor and want to upgrade to System 7. Would it be cheaper to buy a new machine or upgrade my SE/30? If I upgrade, would I need more memory and a color card?

Joseph Hazley
Allenhurst, New Jersey

A. The SE/30 can display color if you add a color card and plug in a color monitor. A color card costs $300 to $500 through mail order at this writing, depending on the maximum number of colors per pixel. Add $75 for installation and $60 for System 7, for a total upgrade price of $435 to $635. A new Quadra 605 with 4MB of RAM, an 80MB hard drive, a keyboard, and System 7—(not to mention a one-year warranty)—costs under $1000. You should be able to get at least $500 for your SE/30, making the net cost of a new Quadra 605 about the same as upgrading your SE/30. Of course, the color monitor will cost extra, whether you upgrade your Mac or replace it.

The 605 has a major practical advantage: three times the SE/30's speed. The SE/30 has two theoretical advantages: a floating-point unit (FPU) and a higher RAM limit (128MB versus 36MB). An FPU speeds rendering, modeling, and scientific analysis—which you probably won't do much on machines such as these—but does little for typical spreadsheets. And adding more than 16MB of RAM would be prohibitively expensive at current prices. Therefore, I vote for the Quadra 605.

CD Start-up Delay

TIP If you start up a Mac from a CD-ROM (not possible on all Macs equipped with CD-ROM drives), then eject the CD, and restart from the hard drive, you will notice a delay of 30 seconds or so before the start-up process begins from the hard drive. To eliminate this start-up delay, which is caused by the Mac's fruitless search for a start-up CD, open the Startup Disk control panel and select the hard drive. You must reset the start-up disk every time you start up from a CD or you'll get the delay.

Chris Stuart
Walnut Creek, California

Pressure-Sensitive Mess

TIP When you're drawing with Adobe Illustrator 5.0's brush tool on a pressure-sensitive tablet, sharp changes in your stroke direction can create messy, overlapping paths. These artifacts make editing difficult and produce unaesthetic results if you apply a stroke to the drawn object. You can clean up those messy paths with the Pathfinder/Unite filter, which is more commonly used to merge multiple paths into one object with a single outline (see "Cleaning Up Messy Paths").

Craig Hillis
Woodland, California

What's Your Sign?

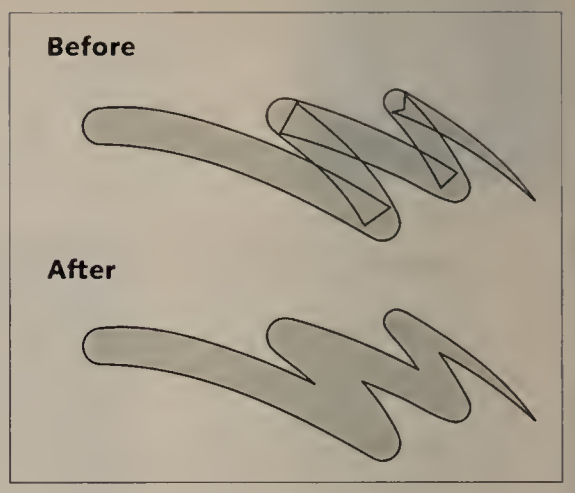
TIP I often want to analyze—to count, sum, or average, for example—the entries in a Microsoft Excel array that are positive, negative, or zero. The Database feature can do this, but I find it clumsy, and it applies to only one array per worksheet. Formulas based on the SIGN() function can also analyze array entries according to sign, and such formulas can be used on any number of arrays in a worksheet. Recall that SIGN(Entry) has the value +1 if Entry is positive, –1 if Entry is negative, or 0 if Entry is zero. (You can replace Entry in this formula with anything that has a numeric value.)

To figure out the number of positive entries in an array named Array, notice that the array formula **{SUM(SIGN(Array))}** counts +1 for each positive entry and –1 for each negative entry in the array. The formula evaluates to $P - N$, where P represents the number of positive entries and N the number of negatives. The formula **{SUM(SIGN(Array)^2)}** counts +1 for both positives and negatives, so it evaluates to $P + N$. The sum of these two formulas equals $P - N + P + N$, which equals $N + N$, or twice the number of positives.

Thus the number of positive entries in Array is calculated by the following array formula:

{0.5 * SUM(SIGN(Array)) + 0.5 * SUM(SIGN(Array)^2)}

Analogously, the number of negative entries is calculated by



Cleaning Up Messy Paths To clean up messy paths created by drawing on a pressure-sensitive tablet with Illustrator 5.0's brush tool, select the offensive object and choose Unite from the Pathfinder submenu of the Filter menu.

{0.5 * SUM(SIGN(Array)) - 0.5 * SUM(SIGN(Array)^2)}

And the number of zero entries is calculated by

{COUNT(Array) - SUM(SIGN(Array))}

Combinations of SIGN() functions can be used to flag entries by sign. For example, **SIGN(Array)^2 + SIGN(Array)** tags every positive entry with a +2 and all others with 0.

The sum of all positive entries is calculated by

{0.5 * SUM(Array * (SIGN(Array) ^2 + SIGN(Array)))}

To get the average of the positive entries, divide this formula by the earlier formula for the number of positive entries. Additional examples abound: **SIGN(Array)^2 - SIGN(Array)** tags the negatives with +2 and others with 0, **1 - SIGN (Array)^2** tags the zeroes with +1 and others with 0, and so on.

Alberto Guzman
Bronx, New York

ShareMail

TIP Here's how a few people on a small network can exchange E-mail messages using nothing more than System 7 file sharing, some aliases, and TeachText. On each Mac that will receive messages, start file sharing with the Sharing Setup control panel and share the start-up disk using the Finder's Sharing command. On each Mac that will send messages, use the Chooser to access the shared disks of all the networked Macs that will receive messages. Open the shared disk of each receiving Mac and make an alias of the folder named Desktop Folder. As you make each alias, change its name to identify the owner of the Mac that contains the alias's original item. Put all these aliases in a new folder (optionally named Mail) on the desktop of each sending Mac. You can now select all

continues

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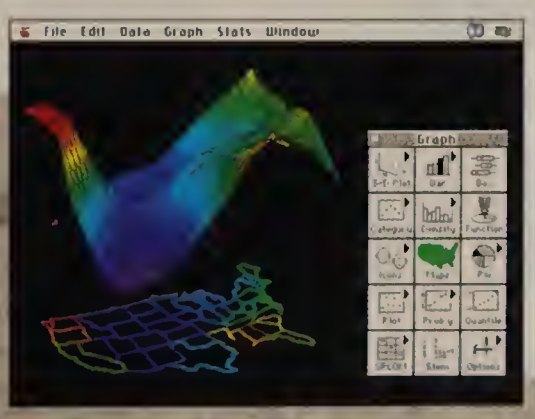
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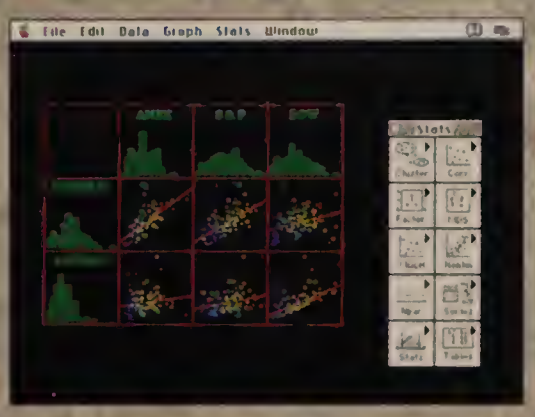
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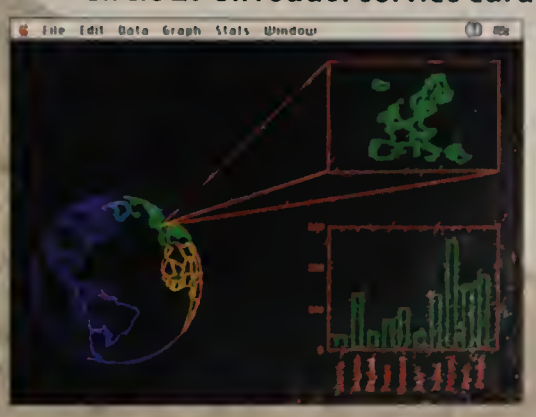
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the shared disk icons and use the Put Away command (or drag the icons to the Trash) to stop sharing them.

Write a message using TeachText or any other program you know the recipient has. You can put the message directly on the recipient's desktop with the program's Save command as follows: From the Save dialog box, double-click the recipient's alias in your desktop Mail folder. Your Mac automatically connects to the recipient's Mac (asking you for your password on the recipient's Mac, if needed), accesses the hard drive, and opens the recipient's desktop in the Save window. Now all you have to do is name the message file and click the Save button.

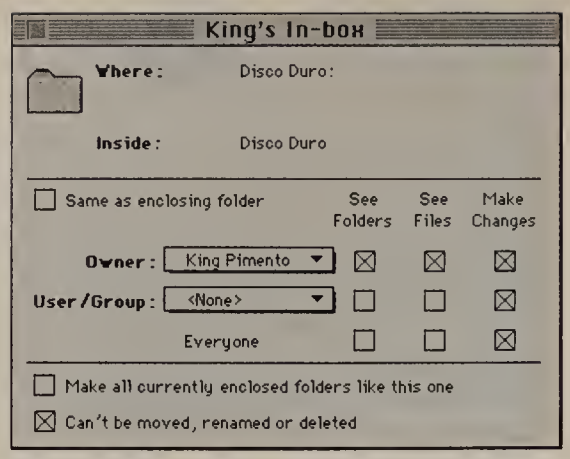
Luc Desaulniers
Montreal, Quebec, Canada

By sharing your whole hard drive with standard (that is, unrestricted) access privileges, you allow everyone with access to your network to snoop through your folders and files without leaving any electronic footprints. For better security, use the Finder's Sharing command to set access privileges for your hard drive, as shown in "Semiprivate Access." Then create a folder at the root level of your hard drive, give the folder a name that identifies it as your in-box, and set the folder's access privileges as shown in "In-box Privileges." Network users can make aliases of each other's In-box folders (instead of their Desktop folders) and send messages by dragging files to the in-box aliases. Under this scheme, network users can't save a message directly into an in-box folder; that's the price of privacy.

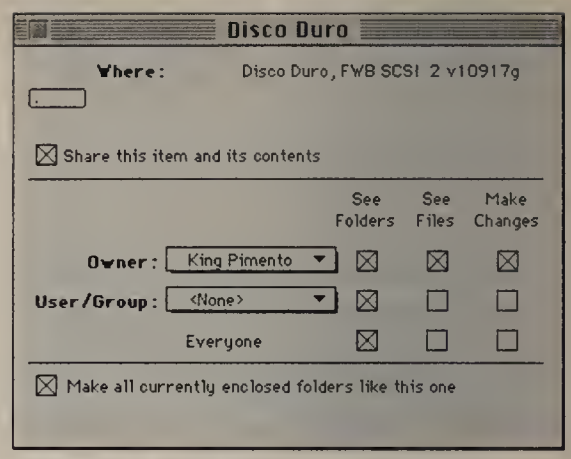
This scheme has another peculiarity you may consider a drawback: if you send a message in haste (by dropping it on someone's in-box alias), you can't retract it because you don't have privileges to see files in anyone else's In-box folder. You can extend the in-box scheme so that people can retract items they have sent. There isn't room here for extensive details, but here's the general idea. On each receiving Mac, use the Users & Groups control panel to create first a mail group and then registered users (who may send mail or other files) to populate it with. Also on each Mac, create an In-box folder. Inside it, create and name an additional folder for each registered user in the mail group. For the In-box folder, use the Sharing command to designate the mail group as the User/Group, and grant all privileges except Make Changes to the Owner and the User/Group but grant no privileges to Everyone (that is, guest users). For each folder inside the In-box folder, designate the user for whom the folder is named as the User/Group, and grant all privileges to the Owner and the User/Group but no privileges to Everyone.

To send an item to a user in the mail group, drop the item on the folder named for you inside the receiver's In-box folder. To retract an item you've sent, open the folder on which you dropped it and drag the item to the Trash. You can simplify accessing your folders inside other people's in-box folders by making aliases of your folders, giving each alias the name of the person on whose Macintosh the alias's original folder is located, and collecting the aliases in an out-box folder on your Mac. To see at a glance whether you've received something new in any folder inside your in-box, set your in-box folder for viewing by name and expand all the folders inside it. (A shortcut: press ⌘-A to select all folders, then press ⌘–right arrow to expand all selected folders.)

Rather than go through this rigmarole, you can use Apple's PowerTalk technology to send and receive mail. With PowerTalk installed you can send mail by dragging icons in the Finder, by creating memos (which can include enclosures) with the AppleMail program, or by attaching a PowerTalk mailer to a document using any application that incorporates this technology. PowerTalk automatically connects to other Macs in the network to send your outgoing mail, notifies you when incoming mail arrives, and lets you categorize mail in your in-box. Each person who wants to use PowerTalk must install System 7 Pro.—L.P.



In-box Privileges These access-privilege settings set up a drop-box folder that works like the corner mailbox. Network users can deposit files and folders in the drop-box folder but can't see—and therefore can't access—what's inside it.



Semiprivate Access These access-privilege settings allow network users to access a hard drive but not to see its files—and what they can't see, they can't open. (If you also deny the See Folders privilege, those users won't be able to access the hard drive at all.) You can always decide later to grant privileges to see files or make changes in specific folders, leaving the remainder restricted.

Where Am I?

TIP If you create spreadsheets or macros for use in both Microsoft Excel and Lotus 1-2-3, you can have your creation determine the program in which it is operating and use this information in If functions to choose between alternate formulas or sets of macro commands that you have optimized for each environment. Here is one way to determine the environment: Enter the number 1 in cell A1, enter the formula **="A1:A1"** in cell A2, and enter the formula **=ISERR(SUM(INDIRECT(A2)))** in cell A3.

Excel considers the range reference in cell A2 valid, but 1-2-3 considers it an error. This means that cell A3 is FALSE in Excel but TRUE in 1-2-3. The range in cell A2 is in quotes so that if someone converts the spreadsheet between Excel and 1-2-3, neither program will convert the range to a formula.

Peter Theron
Madison, Wisconsin

Eye- and Battery-Saver

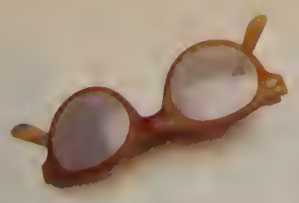
TIP To save battery power on a PowerBook, invert the screen colors by using either Connectix PowerBook Utilities (CPU) (415/571-5100, 800/950-5880) or the CloseView control panel that came with your Mac. With the image inverted (white text on a black background), you can turn down the backlighting to its lowest level before it is totally off. This arrangement is easier on your eyes when you work in dim light, and it's less disturbing to others (especially fellow passengers watching an in-flight movie). To invert the screen with CloseView, just open the control panel and select the White on Black option. To invert the screen using CPU, open its control panel, select the LCD Saver icon, and check the box labeled Invert When Working.

Eric R. Ashby
Los Angeles, California

If CloseView isn't in your Control Panels folder, you'll find a copy on the System 7 installation disk named Tidbits. If you don't like the thick-bordered rectangle that CloseView draws around the pointer (to indicate the screen area it will magnify if you turn on its magnification option), buy CPU.—L.P. **m**

We pay from $25 to $100 for tips published here. Send questions or tips on how to use Mac computers, peripherals, or software (by mail or electronically) to *Quick Tips*, Lon Poole, at the address listed in *How to Contact Macworld* at the front of the magazine (include your address and phone number). All published submissions become the property of *Macworld*. Due to the high volume of mail received, we're unable to provide personal responses.

LON POOLE answers readers' questions and selects reader-submitted tips for this monthly column. His latest book is *Macworld Guide to System 7.1, 2nd Edition* (IDG Books Worldwide, 1993).



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FEATURES	RASTEROPS MOVIEPAK2 PRO SUITE	RADIUS VIDEOVISION STUDIO*	RASTEROPS MOVIEPAK PRESENTER
True 60 field/sec (640 x 480) video capture & playback	YES	YES	30-field capture 60-field playback
24-bit color on large screen displays up to 21-inch at 1152 x 870	YES	NO	NO
QuickDraw acceleration	YES	NO	NO
Pro Features: Device control	YES	NO	Optional encoder with genlock for $649
SMPTE time code	YES	NO	
RGB video input	YES	NO	
Price	$4199	$4499	$1799

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*Prices and features as of 2/1/94. All prices are US suggested retail.

Circle 90 on reader service card

IF YOU'RE USING THE OTHER GUY'S VIDEO EDITING SYSTEM, THERE'S SOMETHING WRONG WITH YOUR VISION.

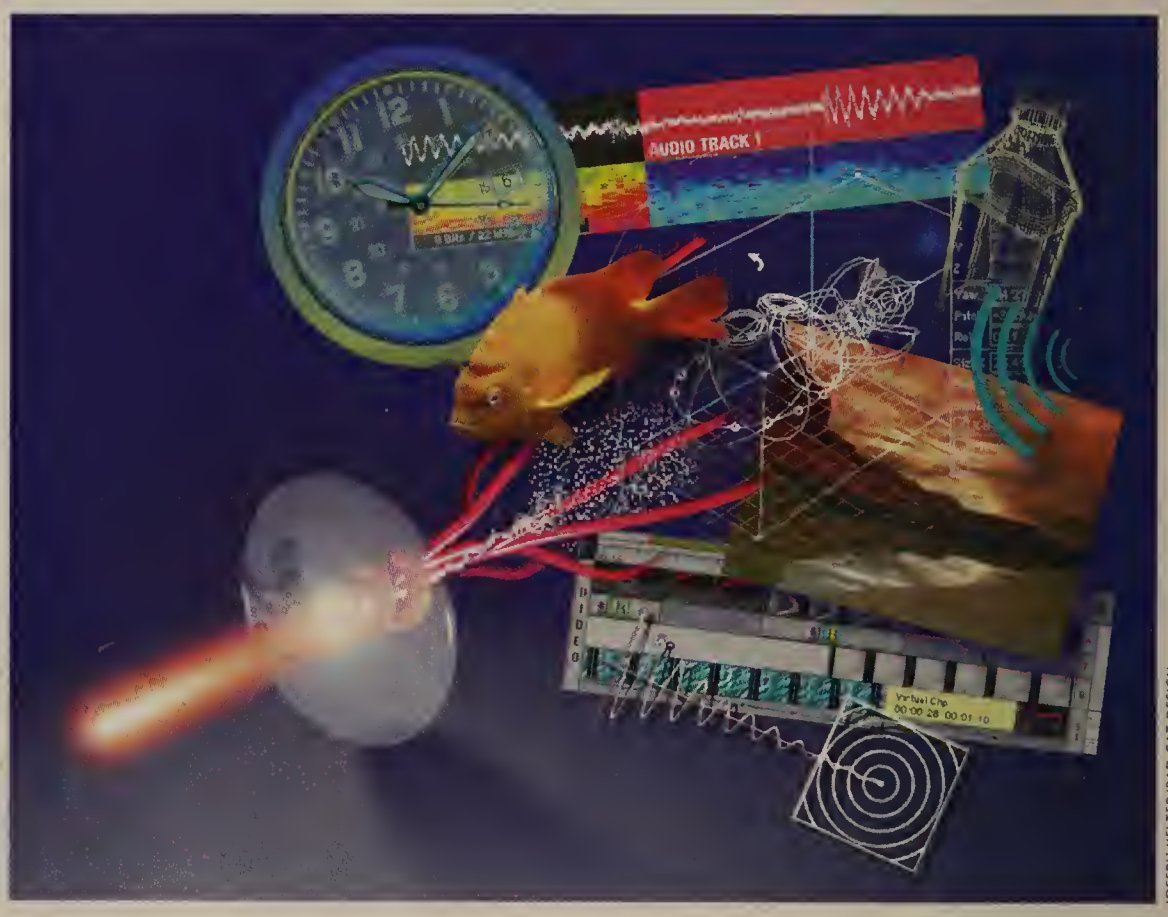


EDITED BY ELIZABETH DOUGHERTY

Networks

THE LATEST IN CONNECTIVITY AND COMMUNICATIONS

Opening Up the Big-File Bottleneck



JOSEPH KELTER/BAD CAT DESIGN

OVER THE YEARS, MAC HARDWARE and software have been optimized for high-performance graphics and multimedia applications, but local area networking hasn't kept pace.

For bandwidth-hungry applications, AppleTalk using LocalTalk—at 230 Kbps—crawls at a snail's pace. Ethernet over unshielded twisted pair boasts a transmission rate of 10 Mbps, but it logs an actual throughput of closer to 5 Mbps. Even over expensive fiber-optic cable, Ethernet doesn't go much faster because the protocol wasn't designed to take advantage of the high-speed capabilities of fiber.

For applications that need better performance, two niche companies, Sonic Solutions and Transoft, have developed specialized high-speed network options. And new technology means a third choice is on the way.

MediaNet from Sonic Solutions delivers a throughput of up to 3 MBps, about ten times faster than Ethernet, over FDDI or CDDI wiring. To achieve such speeds, the company has developed its own transport protocol and file-allocation scheme.

MediaNet's Media Optimized File System (MOFS) speeds data retrieval by allocating disk space in larger blocks than Apple's Hierarchical File System (HFS). The MediaNet transfer protocol (MTP) boasts a more efficient packet size that is ten times larger than AppleTalk's. And MediaNet uses its own on-board processor and SCSI interface, so the Mac's processing power isn't siphoned off for network needs.

Every Mac equipped with a MediaNet NuBus server board ($4495 for FDDI, $2795 for CDDI) can act like a server while operating as a workstation, according to Sonic Solutions. Macs equipped with client boards ($3595 FDDI, $2095 CDDI) can pull files from the server Macs at MediaNet speeds, but dragging a file from a client Mac to the server would take place at AppleTalk pace. Concentrators or hubs ($3575 to $13,995) are necessary to link nodes into a network—as many as 1000 nodes are theoretically possible.

Transoft offers small workgroups a less complex but faster option in the form of a SCSI-to-SCSI network. Called SCSI-Net, the network allows up to 6 Macs to access files housed on a set of common storage devices at speeds between 3 MBps and 5 MBps. The network consists of a SCSI-Net hub ($6500) linked in a star topology to the SCSI ports of the Macs. The seventh port of the hub connects to the common SCSI storage device or chain of devices.

If you can wait to unclog your network bottlenecks, you might want to hold off and take a look at an emerging technology called Asynchronous Transfer Mode (ATM). It's a cell-based transmission method—designed for both local and wide area networks—that will support data, voice, and video at speeds up to 1 Gbps. ATM currently uses fiber-optic cabling, but standards for ATM over copper cabling are on the drawing board.

Eventually, ATM promises to blow the socks off today's existing high-speed networks. Sonic Solutions is working on an ATM version of its MediaNet. Fore Systems, a leader in the ATM LAN field, is developing Macinstosh-compatible ATM adapter cards that will be available later this year.

Sonic Solutions, 415/485-4800; Transoft, 805/565-5200; Fore Systems, 412/967-4040.—MARTHA STRIZICH

Ethernet to Go

SMALL IS BEAUTIFUL WHEN IT COMES to networking products for PowerBooks. Dayna Communications has released two pocket Ethernet adapters; and Xircom, a company that has specialized in Windows and DOS networking products, has followed with a pair of adapters based on the Dayna technology.

Like Sonic Systems' microSCSI (see *Networks* news, *Macworld*, February 1994), the Dayna and Xircom adapters plug into the SCSI port of a networked desktop Mac. In the case of 10BaseT nets, the adapter can draw power from a desktop Mac's ADB port. The adapter's compact power supply is necessary for thin Ethernet wiring, which needs more power than the ADB port provides.

Both companies' adapters include two SCSI ports—one for the PowerBook and one for desktop Macs.

The adapters come in two models, one with a single RJ-45 connector for 10BaseT networks, the other with connectors for both 10BaseT and thin Ethernet. Dayna's single-connector model, the Pocket SCSI/Link-T, lists for $299; the dual-connector PocketSCSI/Link-M lists for $369. Prices for Xircom's models were not set at press time. Dayna, 801/269-7200. Xircom, 818/878-7630.

—NANCY E. DUNN

Compact Hubs Plug and Play

WHETHER YOU'RE SETTING UP A small workgroup Ethernet network or just want to add a few extra nodes, Sonic Systems and Asanté Technologies each has a compact five-port hub that will fill the bill. Both devices have link status lights and allow users to plug and unplug nodes without disrupting the net.

Sonic Systems' HubLite sports five RJ-45 jacks; one jack can be switched between normal and crossover modes. With the latter setting, you can connect to another hub without special wiring. Using this feature, you can create up to four nodes out of a single wall jack wired back into the central office hub. Alternately, up to five hubs can be cascaded to form a small, independent workgroup network. The HubLite lists for $169.

Asanté's entry, the NetExtender Hub, operates on the same principle as the HubLite, but with a slight twist. The NetExtender has four RJ-45 jacks and a single AUI or AAUI connection, depending on which version you order. The latter is intended to plug into a host Mac, from which the unit draws power. The NetExtender can also be cascaded or plugged back into a host network by using an included crossover cable. The product is currently available for $239. Dayna Communications also has a compact hub on the drawing board. Asanté Technologies, 408/435-8388; Sonic Systems, 408/736-1900; Dayna Communications, 801/269-7200.—CAMERON CROTTY



PAUL BERG

Ethernet hubs from Sonic Systems (left) and Asanté come in handy compact packages.

The Cellular Fax

CALLING YOUR BOSS FROM A CELLular phone is simple. Sending E-mail messages or fax transmissions over the cellular network can prove difficult, however, because power-shifts, static, and other noise often interfere with cellular data communications. To tackle that problem, a year-old company called Air Communications (408/749-9883, 800/247-3282) has designed a multipurpose device for notebook computers.

The $1495 AirCommunicator is a fax modem and cellular telephone rolled into one. It uses a proprietary error-prevention scheme that the company claims improves cellular data communications reliability. It can send and receive at 9.6 Kbps over cellular connections and 14.4 Kbps over land lines.

The PowerBook-compatible model, due to ship in May, plugs into the serial port and draws power from its own battery pack. AirCommunicator software monitors transmissions for error rates, signal strength, and throughput.

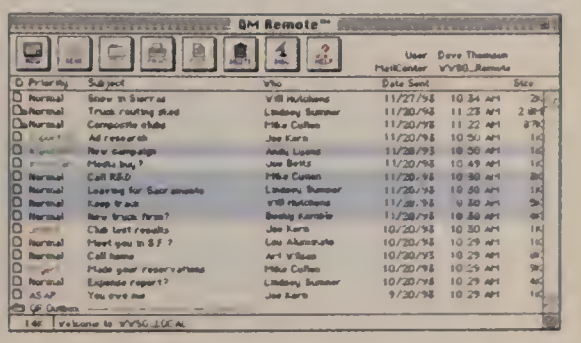
—MARTHA STRIZICH

QuickMail Goes Wireless

A NEW EDITION OF CE SOFTWARE'S POPULAR QUICKMAIL PACKAGE LETS POWERBook users exchange E-mail via wireless modems. To take advantage of the feature, you need QuickMail Remote with Wireless Support ($295), an Intel wireless modem ($795 each for client and server models), and a subscription to the RAM Mobile Data network (201/343-9400, 800/347-0726). RAM Mobile Data runs a private packet-switched network that provides two-way electronic messaging services to 210 metropolitan areas in the United States. Subscriptions usually run $25 to $135 per month depending on usage.

The QuickMail software tells users the size of the messages in their mailboxes, so they can estimate the time and cost of picking up each message. The Intel modems are available from CE Software, at 515/221-1801 or 800/523-7638.

—MARTHA STRIZICH



The QuickMail wireless edition shows the size of each message.

IN BRIEF

■ **Sharing Scanners** Stalker Software has released ScanShare, an $89 Chooser extension that lets users share over AppleTalk-compatible LANs any scanner that supports the Apple Scanner Interface. 415/927-1026, 800/262-4722.

■ **Ethernet-to-LocalTalk Converter** Asanté Technologies' AsantéPrint 8 Ethernet-to-LocalTalk converter connects up to eight LocalTalk printers or Macintoshes to an Ethernet network, with either standard connectors or RJ-45 connectors. 408/435-8388, 800/662-9686.

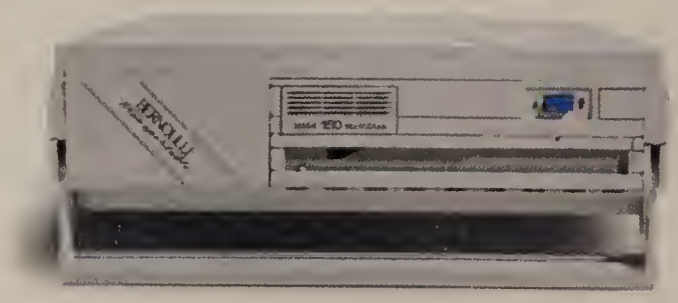
■ **Cisco Adopts ARA 2.0** Cisco Systems, one of the biggest manufacturers of multiprotocol hubs, has added support for ARA 2.0 to its line of products. 415/326-1941.



A side-by-side comparison between SyQuest® and the new Bernoulli® 150.

The new Bernoulli® MultiDisk™ 150.
The most rugged storage to hit the industry.

When it comes to reliability and value, the Bernoulli MultiDisk 150 is a tough one to crack. A big 150MB capacity means more space for color and multimedia projects. Bernoulli's legendary ruggedness withstands over three times the shock than our competition. (No more courier or mailing worries.) Cartridges mount first time, every time. And our new prices are two-thirds the megabyte cost of SyQuest's cartridges.



You'll find Bernoulli is dropping in everywhere. For more information or to locate the Iomega reseller nearest you, call **1-800-753-0694.**

Bernoulli Advantages	Bernoulli MultiDisk 150	SyQuest 88c
70% more capacity.	150MB	88MB
Handles over 3x the shock—no more courier/mail worries.	96 inch drop	30 inch drop
Mounts every time.	Yes	No
2/3 the cart cost per megabyte.	67¢/MB	$1.00/MB
More capacities to choose from to fit your job.	35, 65, 90, 105, 150MB	44, 88MB
Competitive performance.	18 msec	20 msec
Resists head crash.	Yes	No

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Circle 111 on reader service card

TAKE CONTROL OF YOUR SERVERS

FIVE APPLESHARE UTILITIES COMPARED

Are you running yourself ragged trying to manage your AppleShare servers, darting from console to console just to perform day-to-day housekeeping, like adding and deleting users? You're in luck. Today there are several software packages that can help you manage AppleShare servers scattered all over your network, without ever leaving your desk.

Three such software packages offer a core set of functions that basically do what AppleShare Admin does, only better: TechWorks' GraceLAN Server Manager 2.0, Sonic Systems' Server Sentry 2.0, and Farallon Computing's Timbuktu Pro.

These packages let managers perform the same tasks as with AppleShare Admin, but remotely and/or on multiple servers at once, as well as add a few bells and whistles to Apple's basic administration utility. But at $400 to $500 each, these packages are a bit pricey for managing a single server. If you have only one server, or you are interested in extending your management capabilities beyond those offered by AppleShare Admin or even some of these remote-management packages, look into AppleShare server utilities (see "Beyond AppleShare Admin").

GraceLAN Server Manager

GraceLAN Server Manager 2.0 is a robust, well-designed, fairly comprehensive server-management package, appropriate for any medium-to-large AppleTalk network. Server Manager's main improvement over AppleShare Admin—its reason for existence, really—is to allow you to conveniently manage multiple servers simultaneously from one location, provided each server is running an agent system extension.

Server Manager's Users & Groups administration replaces AppleShare Admin's familiar window-based interface with a sleek one that enables you to perform routine management chores in about half the time. The administrator can create user accounts entirely from the keyboard, without constantly



PETER HOEY

BY BILL WOODCOCK

using the mouse for opening and closing user account windows. More important, Server Manager allows administrators to assign multiple users to multiple groups with the press of a single button. In AppleShare Admin you have to open group window after group window and repeat the same select-and-drag to add users to each group. And while AppleShare Admin uses a less-than-intuitive interface for removing users from groups, Server Manager allows you to simply highlight a user name and click on the Deassign button.

Another great feature is Server Manager's ability to import and export text versions of Users & Groups files. Using this feature, the administrator can clone

BEYOND APPLESHARE ADMIN

For a better grip on your server than that offered by AppleShare Admin or its remote equivalents, take a look at Trik's Nok Nok A/S ($175; 617/933-8810, 800/766-0356) and Santorini Consulting & Design's Santorini Server Tools ($195; 415/563-6398, 800/851-7824).

Nok Nok A/S

Trik's single-purpose utility runs in the background on an AppleShare server, where it monitors, logs, and controls user log-in and idle times.

Nok Nok also allows administrators to control maximum idle and connect times for their servers, with appropriate messages that alert users to the limits of their accounts, whether superuser, registered user, or guest user. These features help administrators keep users from leaving client machines logged in perpetually, a problem at many sites that poses both a security risk (when the client machine is unattended) and a performance drain (when the client machine is connected to the server but is not actually using it).

To further address security concerns, Nok Nok's log includes not just account names but also the zone and machine name from which each log-in attempt occurs. It also controls the location and maximum size of the log files.

Trik also sells a useful little system extension that lets managers spot-check for security holes. Every time you open the Chooser, Look Out ($49.95) notes which servers in the list allow guest access.

Although Nok Nok A/S's usefulness and low price make it a good buy, at the time of this writing, the utility's future appeared uncertain. Trik has sold its major software offerings to Symantec, which also hired Trik's lead engineers. While Trik will continue to support the software, don't expect updates until or unless the company finds a buyer for Nok Nok A/S.

Santorini Server Tools

A grab bag of ten different single-purpose utilities, Server Tools is designed to fill in the chinks and holes in AppleShare Admin and the related server-management packages compared in the main article.

All the tools are available individually for $95 or in a bundle for $195. By and large, this means the bundle is very reasonably priced, since most administrators will be able to find use for several of the tools.

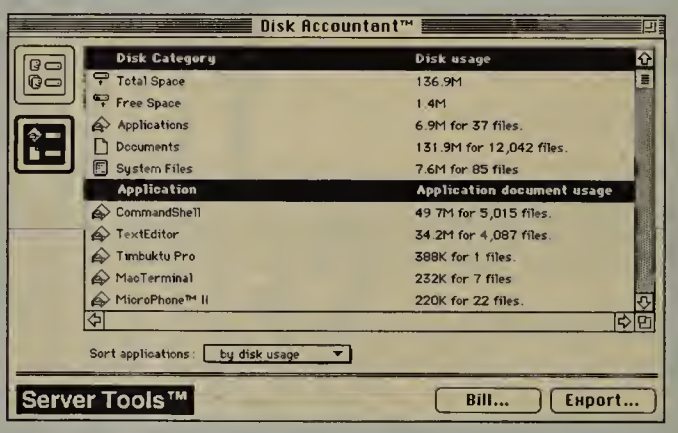
Each utility is very precisely targeted to answer a single management need.

Crash Guard, a control panel loaded on server Macs, reboots machines that have hung or crashed, something that seems only to happen when you aren't in the office. It also creates a log file in the System Folder (the same location as the AppleShare Log file), where it documents the date and time, whether the machine hung or crashed, and the fact that the machine was successfully restarted.

Disk Accountant is a dual-purpose tool. Run periodically on a server machine, the application generates two reports. One report details disk space usage by application and document type, the other by responsible account. Moreover, Disk Accountant can take administrator-supplied cost factors and perform all the calculations needed to break down usage of disk space by individual users or by groups, presenting the administrator with a neatly tabulated report of final figures.

Disk Cleaner is a tremendously useful utility. It sorts through a hard disk and puts duplicate files and applications, defunct aliases, empty folders, and all types of miscellany into a list from which the administrator can delete them directly. On a 100MB boot volume that had been in use for about a year, I was able to reclaim more than 12MB of space that had been taken up by aliases that no longer connected to anything, corrupted files, and a truly shocking number of preferences files for applications launched only once, long ago.

Server Tracker, which runs on AppleShare 3.0, 4.0, and Pro servers, maintains a log of users' actions such as creating, deleting, moving, renaming, or copying files and folders. Server Tracker is the first application to provide this security-conscious functionality. Although the 1MB application memory-partition that Server Tracker demands is a rather high overhead, it is one that many administrators (particularly those of memory-sparing 3.0 and 4.0 servers) will probably find acceptable. A single-server license of Server Tracker is included in the Server Tools package; multiple-server licenses are available separately.



A Full Accounting One of several utilities that make up Santorini Server Tools, Disk Accountant presents a neatly tabulated bill for server usage by group.

Cache Register, the most promising utility of the bunch, will quickly become an indispensable part of any administrator's tool kit. It offers a vital service you simply can't get anywhere else: it plots a chart of all the caches on an AppleShare 4.0 or Pro server. Tallying the number of times a cache is used (or hit), it performs some basic statistical analysis that indicates whether you should increase or decrease the amount of RAM dedicated to a particular cache for maximum efficiency.

Since these caches are responsible for a great deal of the new Apple servers' speed advantage, Cache Register is incredibly useful. Real-world cache use can differ greatly from what you expected when you initially set the caches, so this utility can help you get the speediest server possible without needlessly wasting memory on caches.

entire user-account lists from server to server, giving users the appropriate access privileges and passwords on all servers companywide, without having to manually apply changes to each server's user and group lists.

Server Manager retains the AppleShare Admin interface for assigning access privileges to volumes and folders, but improves on AppleShare Admin's muddled explanation of the inherit- versus explicit-privilege option.

Like AppleShare Admin, Server Manager lets administrators add users and groups without interrupting and restarting the server process. This is something of an accomplishment, since ordinarily it requires opening the Users & Groups database, which is already in use when the server is running. To circumvent this problem, Server Manager creates a superuser account for itself, then 85 empty user accounts and 17 empty groups. To create a new user or group, you simply modify one of these accounts and put it into service. (The unused accounts are completely invisible to the administrator from inside Server Manager. However, anyone who is just looking at the server through AppleShare Admin will see the empty accounts.) You can configure Server Manager to replenish any phantom accounts you have modified each day at a time when no users are logged into the server (in the middle of the night, for instance).

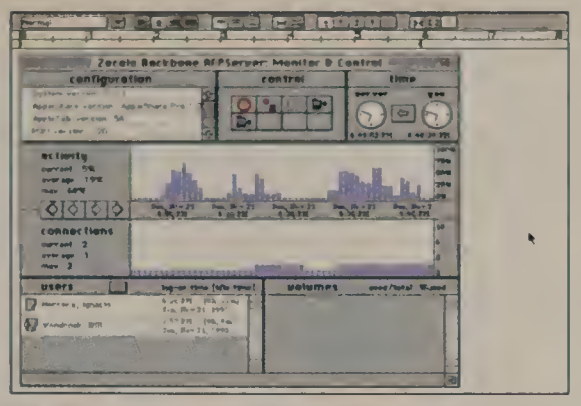
Although Server Manager does not support balloon help, it offers a very thorough help system, accessed through a menu choice found under the balloon help icon.

The level of detail provided by Server Manager's error-alert window (which is automatically triggered by common server problems) is also incredibly helpful to neophyte AppleShare administrators. Rather than just naming a problem in technical jargon, the alert carefully explains the nature of the problem and proposes a means of correcting it.

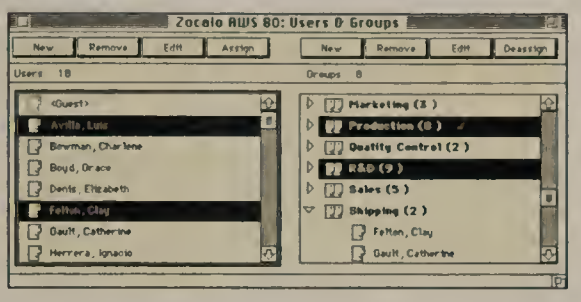
Server Sentry

Server Sentry 2.0 from Sonic Systems offers the same basic features as GraceLAN Server Manager but with a little less panache.

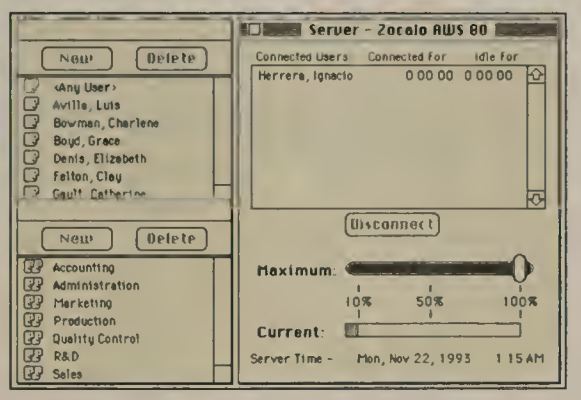
When it comes to administering servers and groups, Server Sentry retains the look of AppleShare Admin, which wasn't designed to administer more than one server at a time. Thus, while Server Sentry's interface looks familiar, it unfortunately multiplies AppleShare Admin's profusion of windows by the number of servers being managed. The result can be a desktop so cluttered with windows that it's difficult to tell which window belongs to which server.



Traffic Cop A real-time bar chart in GraceLAN Server Manager's Monitor & Control window gives you some idea of how hard your server is working and who is currently logged in to your AppleShare server.



Juggling Servers Perhaps GraceLAN Server Manager's greatest strength is its simple interface, which lets you create and delete users and groups with a single keystroke.



Familiar Interface While administrators will certainly know how to use the Server Sentry software, the screen can get confusingly cluttered.

Like GraceLAN Server Manager, Server Sentry ships in two parts: an agent application, which runs in the background on AppleShare servers, and a console application, which runs on the administrator's management workstation.

Server Sentry offers a usage histogram similar to GraceLAN Server Manager's, but it stores the information on the server rather than on the Mac running the Server Sentry application. Not only is there more room to save log data on the server, but the agent, always running in the background on the server, can manage the info constantly. (It saves more-recent information in greater detail, and thins out the older historical information to save space.)

Server Sentry can also create phantom accounts (250 users and 100 groups), which you rename and put into service as needed. This feature is optional in Server Sentry, so the administrator must remember to turn it on when initially configuring the server.

Server Sentry allows administrators to drag user and group names between the windows associated with different servers, but unlike GraceLAN Server Manager, Server Sentry cannot copy the user's password, which makes one wonder how the feature could be put to practical use. If the manager creates new accounts without passwords, the users have to log in to the new servers and set the passwords. Unless you individually configure new user accounts to force setting a password on log-in, many users will simply leave their passwords blank and your server riddled with security holes. The alternative is to maintain a table of users' passwords to refer to when you move accounts, a terrible security risk that would also require banning users from changing their own passwords.

One of the few things that Server Sentry offers that GraceLAN Server Manager doesn't match in some way is the ability to schedule a disk-usage report (or some other report that might take a lot of time and tie up the processor) to be run overnight and delivered to the administrator via E-mail.

Timbuktu Pro

Long a favorite of network administrators, this screen-sharing utility lets you open a window on your desktop through which you can view and control the desktop of another computer (including a server). As a result, Timbuktu Pro lets you do anything you can do with AppleShare Admin, only from your own desktop instead of from the server's keyboard.

Timbuktu Pro, Farallon Computing's impressive upgrade to Timbuktu 5.0, extends Timbuktu's famous ability to control so-called headless servers (server machines sans monitor and keyboard). Now the software can control every type of AppleShare server, whether version 3.X, 4.X, or the new A/UX-based AppleShare Pro. (For more on Timbuktu Pro, see *Reviews*, in this issue.)

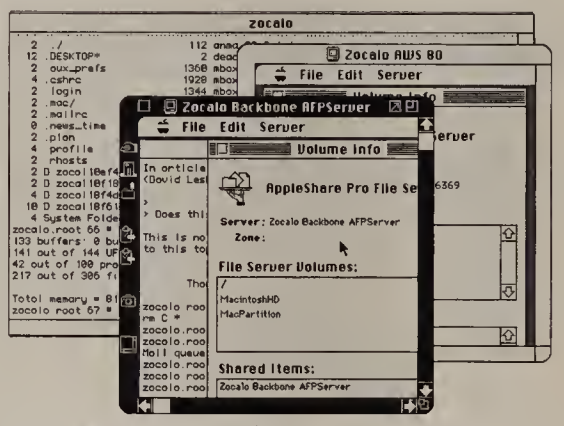
Surprisingly, I was unable to find any bugs or glitches, despite this being the first release with A/UX support. The only drawback is that Timbuktu Pro, ironically, doesn't support Unix's native networking protocol, TCP/IP, when it runs under A/UX. Instead, it forces you to use AppleTalk to control a Unix-based AppleShare Pro server. This is no impediment to administering the server; you just won't get the speed that you would using Unix-native protocols.

Help with AppleShare Server Management

	AppleShare Admin	GraceLAN Server Manager 2.0	Server Sentry 2.0	Timbuktu Pro
Company	Apple Computer	TechWorks	Sonic Systems	Farallon Computing
Price	NA [A]	$395	$499	$398 [B]
Administer accounts remotely	○	●	●	●
Set access privileges remotely	○	●	●	●
Monitor server activity	○	●	●	○
Shut down and restart remotely	○	●	●	●
Shut down and restart automatically at crash	○	○	○	○
E-mail and pager alerts	○	●	●	○
Notify when guest logs into server	○	●	●	○
Restrict server access by time of day	○	●	●	○
Limit idle time	○	●	●	○
Set server clock	○	●	●	●
View cache hits	○	○	●	○
Change cache settings	●	●	●	●
Remotely monitor applications running on server	○	○	●	●
Balloon help	●	○	○	●
Online help	○	●	○	●
Disk usage report by user and group	●	○	●	●
Administrative logs	●	●	●	●
Phone	408/996-1010	512/794-8533	408/736-1900	510/814-5000
Toll-free phone	800/776-2333	800/765-0731	800/535-0725	○

● = yes; ○ = no; NA = not applicable. [A] Is included in the price of the AppleShare Server. [B] For two copies of the $199 software, one for the server and one for the desktop machine.

Timbuktu won't make your AppleShare servers any more functional than they are when you administer them directly from their own keyboards, but it will allow you to manage them all from your own desktop, something that will save you steps. It can also help keep physical security tight by allowing server administrators to remove monitors and keyboards from servers and/or place servers in locked closets.



Remote Control Although it doesn't tack any bells and whistles onto the administration program that ships with AppleShare, Timbuktu Pro does offer the convenience of manipulating the administration programs of multiple servers at once from windows on your own Mac's desktop.

Worth the Investment?

Vendors who sell remote-server applications claim they save you many times the cost of the package in time and convenience. But you don't always need everything the packages offer. In fact, sometimes you don't need remote administration at all. Also, since the ways AppleShare servers are used vary so greatly, it's impossible to recommend any one product for all network administrators.

For administrators who manage only a single server, remote management is less a necessity than a luxury. Remote management isn't particularly useful if the server's location is convenient to you. Timbuktu can make life a little easier for the network manager, letting you run a headless server and perform basic management without leaving your desk. However, unless you plan to also use Timbuktu for functions other than AppleShare server administration, your money might be better invested in special-purpose server utilities such as Santorini Consulting & Design's Santorini Server Tools or Trik's Nok Nok A/S, both of which extend your management reach into areas that AppleShare Admin doesn't cover (see "Beyond AppleShare Admin").

If you manage several servers in different locations, a combination of Timbuktu Pro, the appropriate modules from the Server Tools package, and, optionally, Nok Nok A/S provides nearly any type of management service you could possibly need. (You don't need Nok Nok A/S unless you operate in an environment where detailed control and accounting of server usage is important, as when the administrator must charge specific departments by how much they use the server.) Timbuktu is the most comprehensive and powerful remote-management option if you need to manage more than just AppleShare.

But if you administer a truly large site with hundreds of AppleShare servers, configuring several different tools on each server can pose an excessive burden in time and money. In such a case, standards are a blessing, and you may want to consider a single, more comprehensive package. Of the two products compared here, GraceLAN Server Manager wins my vote for its simplicity and adaptability to large networks. I'm especially impressed with its ability to clone user accounts and to display several server settings at once without so many confusing open windows. Besides, it sells for about $100 less than Server Sentry.

Whatever your AppleShare server management needs, choose carefully and consider the future expansion of your network. And remember that when it comes to network management, value is in the eye of the administrator. What's best for you will depend greatly on how many servers you have, how spread out they are, and how much time and money you can afford to spend. **m**

BILL WOODCOCK is a member of the board of directors for the Apple Network Manager's Association, author of *Networking the Macintosh* (McGraw-Hill, 1993), and principal for the Berkeley, California, network consulting firm Zocalo Engineering.



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BY CARY LU

PowerBook Notes

Adding onto a PowerBook

I'VE PREVIOUSLY COVERED MANY BASIC accessories for PowerBooks—security cables (June 1993), modems (May 1993), memory (September 1993), and printers (February 1994). This time I go beyond the basics to a variety of useful PowerBook accessories. Like the products I covered in the past, these have one thing in common—they all work well on the road.

Keypads

Since the PowerBook lacks a numeric keypad, you normally enter numbers from the top row of the keyboard, a process that can quickly become tiresome. One alternative is to define your own numeric keypad by remapping some of your existing keyboard's keys (see "Embedded Keypads"). Such embedded keypads are pretty hard to use unless you can find a way to attach labels to the redefined keys. Apple decided against doing its own embedded keypad because the necessary labels would have cluttered up the keyboard.

For serious number entry, an external keypad is the best choice. Sophisticated Circuits (206/485-7979, 800/769-3773) follows Apple's keypad layout with 18 keys on its PowerPad (18.9 cubic inches, 8.1 ounces with cable; $115). A special key switches among four modes—number; cursor-key in a diamond layout on the number keys; and two flavors of function-key (F1–F15), one locking and the other a single-keystroke mode that automatically returns to number mode. An LED indicator shows the mode, but you must remember the different codes—off, steady, fast flashing, slow flashing. The enter and plus keys can be swapped to make the keypad mimic common adding machines, enhanced by an included



adding machine program, 10 Key Tape. A pass-through ADB port allows you to connect another device.

The NoteBook KeyPad (29.6 cubic inches, 7.3 ounces) from Kensington Microware (415/572-2700, 800/535-4242) has 22 keys, including a horizontal row of four cursor keys on top. Most keys have two modes—number and function key; you switch modes by pressing two cursor keys simultaneously. The Kensington KeyPad sells for $119.95 ($149.95 with a pass-through adapter and adding-machine software).

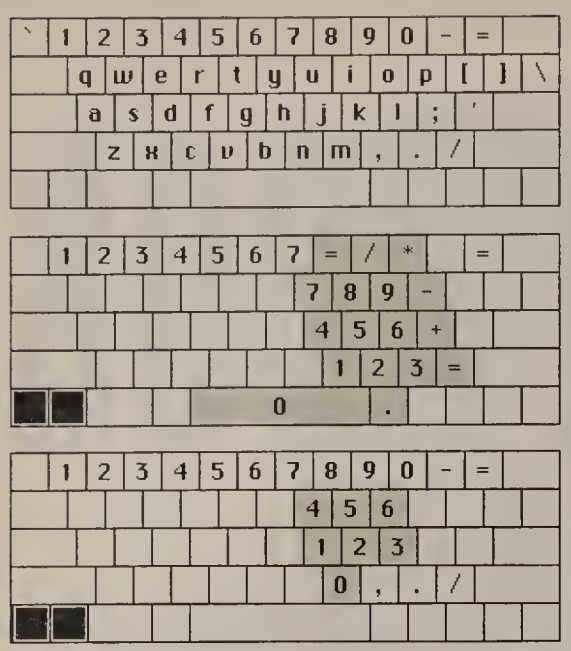
The $149 Abacus (25.6 cubic inches, 7.8 ounces; Key Tronic Corporation, 509/928-8000, 800/262-6006) has the most keys—28. Its most distinctive feature is an eight-digit LCD display; using its own internal processor, the Abacus operates as a four-function memory calculator whose computations can be transferred to the Mac. Four small cursor keys are arranged in an inverted-T layout (just like on the Mac extended keyboard); six small keys let you select modes (including function-key and calculator modes with a separate indicator light for each) and calculator options.

The Plusware Numeric Keypad (13 cubic inches, 7 ounces; $64.95) from Plusware (905/477-0015, 800/268-7587) has 23 keys, with 4 cursor keys on the right side, plus a shift key for the function-key mode. Unlike on other keypads, Plusware's shift key does not latch; you hold it down with your little finger while pressing another key. The Plusware's thinness is due to its short keystroke design.

The MacPad Extended (35.5 cubic inches, 14 ounces) from SIIG (510/657-8688) resembles the Kensington keypad in layout and operation; street prices go as low as $39. This spring, Mace (213/780-6110) plans to ship the MacAlly keypad with 22 keys and three modes (number, function, cursor); to switch modes you hold down the num lock key and watch two LED indicators. The street price should be about $70.

Which keypad should you get? The PowerPad has the smallest footprint; it's the only one with a hard cover that also acts as a tilt base. Its cable is detachable, to minimize damage from sharp bending where it connects to the device; it's easy to pack—and easy to lose. The MacPad is simpler because it doesn't attempt as many modes. The Abacus has the most functions, yet its mode selection is easier than any of the others'. All of these keypads tread lightly on the PowerBook battery, with low power consumption. And they all work on any Mac; some people use them to replace the extended keypad of the Apple Adjustable Keyboard.

continues



Embedded Keypads An embedded keypad reassigns standard PowerBook keys to keypad functions. The top keyboard shows the standard PowerBook layout. David Kreindler's freeware PowerBook Numeric Keypad (middle) is an alternate keyboard definition that you can select with the Keyboard control panel. Kreindler's key assignments closely follow Apple's keypad layout on its desktop keyboards. If you aren't locked into this layout, you can use ResEdit's KCHR editor to customize your own, such as this one (bottom), which leaves the top row (7, 8, 9) intact and adds the other numbers below. With either method, you invoke the keypad by holding down the control and option keys (shown in black). Whichever layout you use, you'll probably want to label the remapped keys to keep track of them. If you use the middle layout, you'll have to label 17 keys, whereas the bottom keypad remaps only 7.

Keyboards

The alternative to adding a numeric keypad is to replace the entire keyboard. The problem is that most keyboards are nearly the size of a PowerBook, although much lighter. The smallest keyboard that works with a PowerBook is the discontinued 81-key ADB keyboard sold for the Apple IIgs, which is 29 percent smaller than the standard Macintosh keyboard; nevertheless, it has a numeric keypad and standard key spacing. The MacAlly has a slightly larger, 96-key keyboard that adds a row of 15 function keys. I wouldn't take either one on an airplane trip, but if you travel mainly by car, you may find them convenient.

ADB Ports

If you have a Duo, then you need to add an ADB port with a suitable Dock. The Duo floppy adapter includes an ADB port, as do many larger docks. DGR Technologies (512/476-9855, 800/235-9748) has announced a small, $59 ADB adapter that plugs into the ADB wire inside the power jack to provide a standard ADB connector. (The ADB connector in the power jack controls the external Duo battery charger.) Unlike Apple's battery-powered floppy adapter, the DGR device is not truly portable because it requires an AC power source.

If you need more than one ADB port, you'll need an ADB splitter cable (available from many vendors). Kensington includes a small splitter with some of its keypads; the company has not yet decided if it will offer the splitter separately.

Serial Ports

The two serial ports built into most PowerBooks may not be enough. Computer Gate (408/730-0673) sells a two-position switch (model SB0802) for $8.95 and a four-position one (SB0804) for $12.95 that let you connect more serial devices. You'll need a cable to connect the PowerBook to the switch; the cable type

continues

MAKING MEMORY GO FURTHER

Most PowerBooks come with 4MB of RAM, sufficient for running only one or two applications at a time. Until recently, running more than two applications meant you had to add more RAM.

But now there's another, less costly alternative, a software workaround from Connectix Corporation (415/571-5100, 800/950-5880) that may let you put off that RAM purchase. RAM Doubler ($50 to $60 on the street) adjusts the memory allocations so that the System behaves as if it has twice as much memory. RAM Doubler memory isn't quite as good as the real thing, but it does come close. For example, if you "double" 4MB of RAM, you shouldn't increase the memory allocated to any one application, but you can launch additional applications that together would normally require 8MB. RAM Doubler achieves a pretty high degree of compatibilty, but it does exact a small speed hit—about 5 to 10 percent—that's barely noticeable. If you pack programs into memory, especially programs that use memory intensively, such as bitmapped graphics, RAM Doubler will slow everything down considerably. Because it won't work on 68000-based Macs, RAM Doubler is incompatible with the PowerBook 100. (For more on RAM Doubler, see *Reviews,* in this issue.)

For heavy-duty graphics and other memory-intensive applications, you need real memory. PowerBook memory prices have been stable for months now, $40 to $50 per megabyte (installation may cost extra). How much should you get? Most people buy 4MB, bringing the total to 8MB (the maximum for the 100, 140, 145, and 170 models). For those PowerBooks that can accommodate it, I recommend at least 8MB more for a total of 12MB.

Setting up a RAM disk is the best way to improve your PowerBook's speed and responsiveness. With 12MB, you can set aside 6MB for a RAM disk with a pretty complete System Folder and some additions (such as control panels, extensions, and fonts), a key application, and still have at least half a megabyte left over for documents. This split leaves 6MB of working RAM. For more document space, you can make the RAM disk larger than 6MB, provided the corresponding reduction in the working RAM does not create a problem. RAM Doubler can help out; it requires only 4MB of working RAM, allowing you to set up an 8MB RAM disk with more than one application.

If you have only 8MB of RAM, total, you have to plan carefully. If you use RAM Doubler, your RAM disk can be no more than 4MB, enough for a minimal System Folder and an application and at best a few hundred kilobytes for documents. Any system additions will eat into the document space.

If you use a RAM disk on any PowerBook except a 100, you must save its contents on your hard drive before you shut down, or else the RAM's contents disappear. Several programs create a persistent RAM disk, one that is automatically saved to the hard drive on shutdown and restored on start-up. The best persistent-RAM-disk software thus far is Atticus RAMDiskSaver ($69.95, 203/348-6100). It backs up by synchronizing files, so it needs to copy only changed files, which is much faster than copying the entire RAM disk. Synchronizing also makes it easy to back up while you work, either automatically at preset intervals or manually. Setting a RAM disk as a start-up disk is usually a two-step process from a shut-down PowerBook, even if you have persistent RAM disk software. You first have to start up from the hard drive, during which time the software rebuilds the RAM disk. Then you have to manually restart from the RAM disk. RAMDiskSaver automates the process, performing the restart for you.

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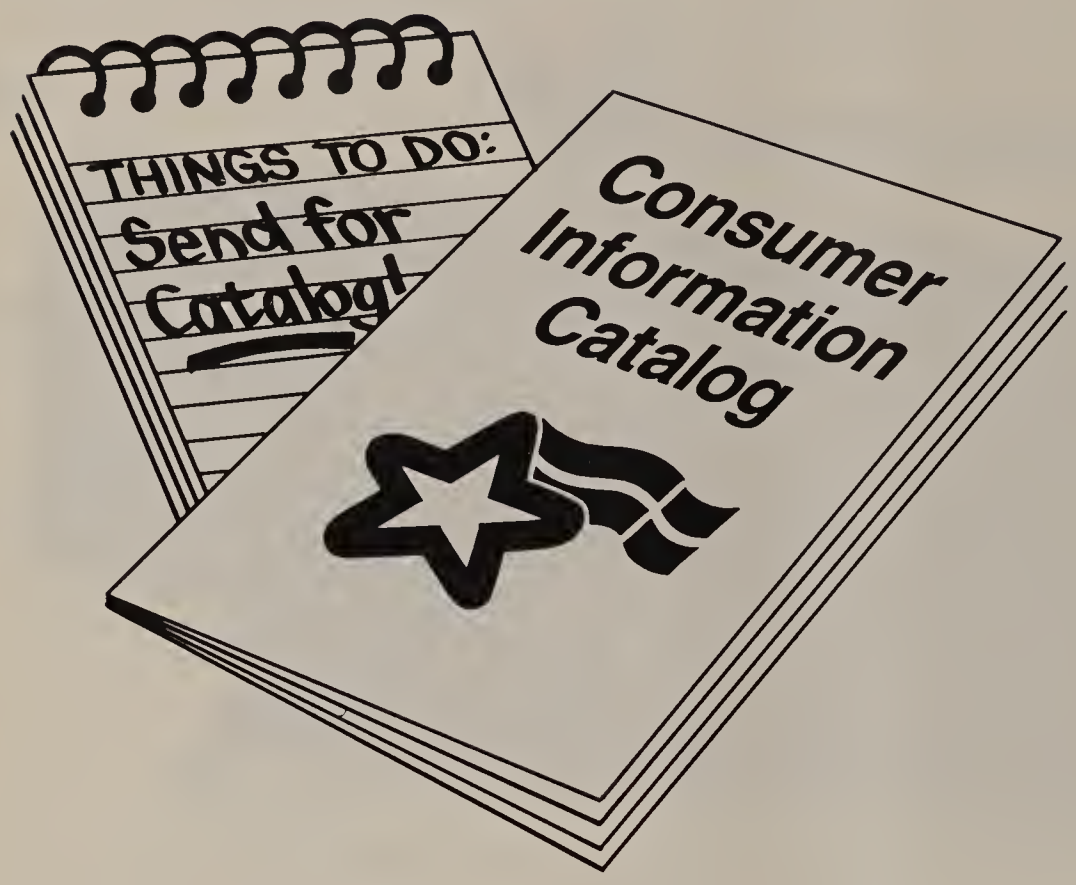
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depends on the switch's internal wiring. I don't know of any current serial-port device that can be damaged by switching with the power on; check with the manufacturer if you are not sure.

Two companies have electronic switching boxes. The $99 Port Juggler (Momentum, 808/263-0088) automatically switches among four serial-port devices; the supporting software decides which device you need whenever the serial port is turned on. You can also switch manually, via F-keys. (Version 1.0 does not work with MIDI; Momentum says 2.0 will.) The $129 Axion Switch (Axion, 408/522-1900, 800/829-4661) does manual switching among three devices from a control panel or a pull-down menu; devices that use Apple's Communications Toolbox can be switched automatically. The Axion Switch needs a $20 accessory cable to handle a MacRecorder, GDT PowerPrint, or any other device that draws power from the port; the Port Juggler needs no accessories.

Some caveats: If you are using a PowerBook's internal modem, the modem serial port is not active. If you have a LocalTalk network connected through the printer port, these switches suffice for simple printing; for file sharing and other intensive network use, you shouldn't put a switch on the network port.

PowerBook 100 users have just a single serial (printer) port. Sigma Seven Systems (604/743-2416) makes PB Serial Adapter ($99), which puts a modem serial port in the space of the internal modem; a standard mini-DIN connector comes out the telephone line opening. (Sigma Seven can also install a floating-point coprocessor in a Duo 210, 230, or 250, or in a Duo Floppy Adapter.)

Telephone Dialers

My favorite accessory is a telephone dialer. The best I've seen is the $75 Desktop Dialer from Sophisticated Circuits (206/485-7979, 800/769-3773). It connects to the ADB port and can dial on one or two phone lines. In its control panel, you can define dialing hot-keys and dialing prefixes. It can dial any number on screen that you select, although not with all applications (Microsoft Word is not compatible, for example). It's about the size of two audiocassettes and weighs 4 ounces (excluding cables); it uses 5 milliamps of power when inactive, and 50 milliamps briefly during dialing; it has a pass-through ADB port. **m**

CARY LU is a *Macworld* contributing editor who covers mobile- and remote-computing issues in this monthly column. His books include *The Apple Macintosh Book* (Microsoft Press, 1992).



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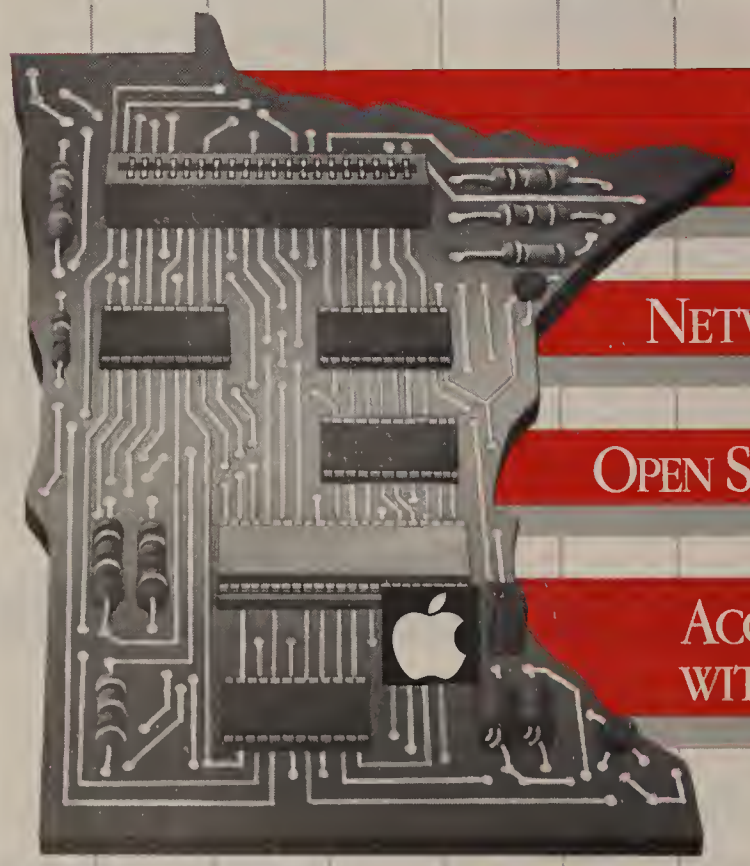
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BY DAVID POGUE

High Trek

A galaxy of products confirm the Mac–Star Trek link

CONSIDER THESE AMAZING morsels: (1) At the 1994 Official Star Trek Expo in Anaheim, California, *83 percent* of the attendees listed themselves as Macintosh users. (2) Both Leonard Nimoy and William Shatner have appeared in PowerBook commercials. (3) The Star Trek screen saver outsells Microsoft Excel three to one.

Actually, none of this is true. But jeez, it sure ought to be. If you log on to America Online and search for "Star Trek," *620* files turn up (versus 12 for *word processor*.) Few online discussion groups are more popular than the Trekkie areas. And the Mac marketplace is flooded with "Star Trek" stuff. Games. Fonts. Sounds. I think I'm definitely onto something here.

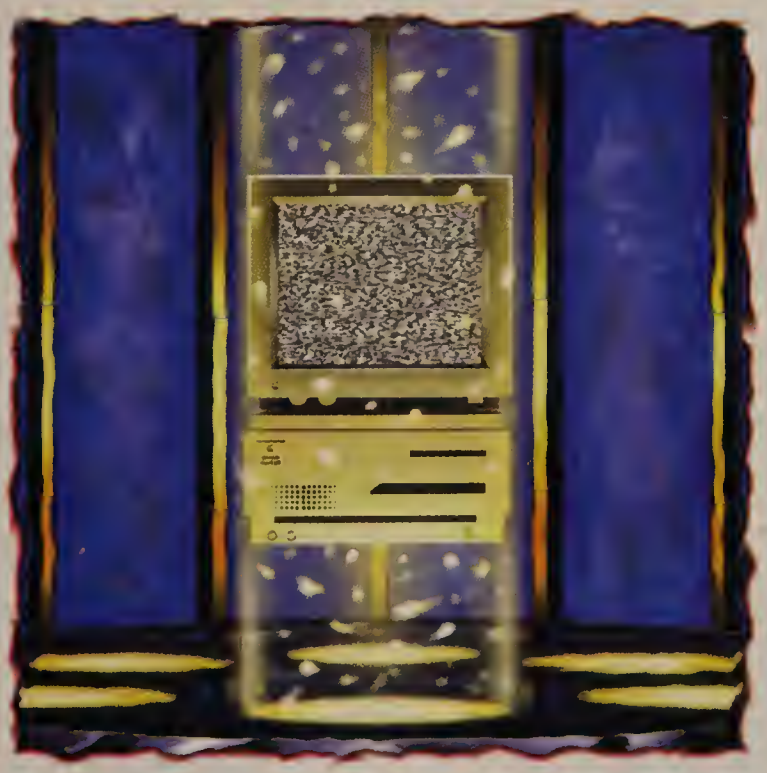
So, incidentally, does Kristine Ross. She's the woman at Paramount Licensing whose permission you need if you want to sell a Mac-based "Star Trek" product. In her words, there's an "overwhelming correlation" between Mac users and Trekkies. (She doesn't much mind; since the TV show went off the air in 1966, Trekkies have bought $650 million of Official "Star Trek" Whatever.)

Not just *any* 30-year-old TV show scores with Mac types; the last time I looked, there weren't any "60 Minutes" mouse pads or "Flying Nun" screen savers. So what accounts for the intense Mac/Trek symbiosis? Maybe we feel empathy for social outcast Spock—we have counterculture computers; he has pointy ears. Maybe it's the shocking coincidence that the first two notes of both "Star Trek" TV show themes form an interval of a fourth—the same as the entire Mac II series' start-up chime. Or maybe it's the scene in *Star Trek IV* where Scotty, warped back to 1986, holds a Mac Plus mouse to his mouth and hilariously barks, "Hello, computer!" (Things would have been different if he'd had an AV Mac. Then again, maybe not.)

Anyway, here's a roundup of the hottest, latest, Mac/Trek stuff for those who like to boldly go where no man has gone before—or to boldly split infinitives.

Star Trek: The Screen Saver 1.0

From the makers of After Dark comes this collection of 14 screen-saver modules ($49.95; Berkeley Systems, 510/540-5535). Some modules are hilarious: a mirthless, 2-inch Spock slouches across your screen, taking readings and muttering "Fascinating." Some are deep-down satisfying: as the theme from the TV show plays, you stare into an infinite, black, starry sky as a shining *Enterprise* glides smoothly past a spinning planet. Other modules make your Mac screen resemble that of a computer on the *Enterprise:* impressive diagrams of spacecraft floor plans, planets, or medical conditions flash onto your darkened screen, complete with futuristic-looking diagnostic text. (As with all computers portrayed on TV and in movies, screen text is nonsensically accompanied by that electronic teletype sound.)



A handful of the modules are obviously great. Some are obviously fillers, little more than spacified editions of existing After Dark modules. Also, as AV Mac owners and some Mac game players have discovered, After Dark isn't the most compatible screen saver in the galaxy. Once you've lectored that caveat, however, if you're a Trekkie, buy this program. And may the Force be with you at Warp 9. Or whatever.

Star Trek: 25th Anniversary

"Fascinating, Captain. A strange and foreign world. Laws of interface we are not familiar with. There appear to be no menus; graphics are colorful, but pixelated and jagged. We cannot even recognize our own faces. Sensors indicate a crude port from an alien operating system."

"Dammit, Jim, I'm a Mac fan, not a detective. How do you play this game?"

"Sir, I'm getting a high-frequency manual here. Indicates a series of eight interactive adventures, each half an Earth day in length. Text appears to be in a crude, all-capitals font. There are dozens of icons, but all are unlabeled. And cursor movement is frustratingly jerky, sir."

"Thank you, Uhura. Shoddy graphics and weak mechanics duly noted. Still, this being the only 'Star Trek' product that actually has a plot, characters, and dialogue—pretty good, at that—I'm inclined to proceed. Set course for MacPlay, phone sector 714/ 553-3530, warp $59.95."

Star Trek Font Packs 3.28

Two sets are available (Bitstream, 617/497-6222): the Bitstream® Li'l Bits™ Star Trek® PostScript® Font Pack and the Bitstream® Li'l Bits™ Star Trek®: The Next Generation™ PostScript® Font Pack. (No exaggeration on those trademark symbols, by the way; let that be a lesson to anyone who thinks it's a picnic getting the rights to this stuff.)

Anyway, these font packs are terrific. Each contains six fonts, representing virtually every symbol or typeface you'll ever see in the credits or sets of the corresponding productions. For example, the regular Star Trek pack contains Star Trek (titles and credits of the sixties TV show), Star Trek Film, and even Star Trek Pi (uniform insignia—☆ € ⋏—for the love of Mike). The Next Generation pack

continues

offers STAR TREK NEXT (title font), Crillee Italic (credits), and Swiss 911 (computer screens, medical monitors, and so on), among others. Fortunately, Bitstream has taken the liberty of filling in each font's missing lowercase letters, numbers, and symbols. Unfortunately, the company offers no bold or italic versions of these fonts. (And don't try to make your own, says the otherwise outstanding manual: "Once a character is altered, it is no longer an official STAR TREK character." Heaven forbid.)

Despite the officialness and gorgeousness of these fonts, you gotta wonder exactly how useful they are. I mean, are you really gonna write letters that begin: "DEAR UNCLE JACK . . . "? Then again, each pack is only $19.95. At that price, you can satisfy the Trekkie inside you without losing self-respect.

Star Trek Mousepad

Wanna know the nice thing about Trekware? It's that usually the people who sell this stuff are too authenticity-obsessed to scam other Trekkies. Case in point: Moustrak's Star Trek Mousepad mouse pads ($9.95 or $16.95 depending on size and finish; Moustrak, 702/884-1925). *Mouse pads?* Jeez, I thought, are we milking the wallets of helpless Trekkies just a mite shamelessly, or what?

I needn't have worried. This is no crumbly foam slab with a tiny Captain Kirk stamped in the lower-right corner. No, we're talking 8½-by-11-inch, shiny-topped, gorgeously illustrated pads (one is actually 12 by 12 inches). Each pad is covered, edge to edge, by a striking full-color painting in the style of a *Star Trek* movie poster. Five different designs are available: three feature spectacular images of the *Enterprise*—passing a gauzy nebula, docking at an immense Federation space station, and so on. Another shows an only slightly goofy rendering of the complete "Next Generation" cast's heads. My favorite pad shows a breathtaking Klingon cruiser soaring through a yellow sky past an alien, cliffy landscape. Any Trekkie rabid enough to recognize this scene from *Star Trek IV* should probably buy all five pads and switch them daily.

Star Trek AudioClips

I'll tell you what makes the blood of Kristine Ross—the licensing lady, remember?—boil. It's the thousands of "Star Trek" sound and video clips on America Online and other bulletin board systems, posted there illegally by fans for other fans to download and use. All of this recording and distributing goes on without permission (and, need I add, without payments).

Star Trek AudioClips ($37.95 for 66 sound snippets; Sound Source Unlimited, 805/494-9996) are fully authorized by Paramount. But that's only one reason to love them. These juicy, well-curated collections of dialogue, sound effects, and music snippets have been recorded with incredible clarity from the sound reels of the original TV shows. Since they come with SoundMaster, the little control panel that lets you associate a sound clip with everyday Mac events, you can hear the transporter shimmer when you shut down, or "He's dead, Jim" when you empty the Trash.



Desktop: The Final Frontier Now you can do something with your computer that's much more practical than work: sit and watch it re-create classic scenes from a TV show that's been off the air for 25 years! All you need is Star Trek: The Screen Saver.

Only one problem: my friend Alison has witnessed an unexpected downside at work—the increasing irritation of coworkers when someone's Mac broadcasts these blips and bleeps all day long.

For that troubled Trekkie, perhaps the trick is to track down additional sets of sounds for variety. There are two AudioClips sets from the original TV show and two sets from "The Next Generation"—not to mention sound-bite sets from *Star Wars*, *2001*, and that sci-fi classic *The Wizard of Oz*.

The Nitpicker's Guide for Next-Generation Trekkies

You can find shelves upon shelves of "Star Trek" books, of course. I mention this one ($12.95, Dell, 1993, 433 pages) because (1) it's new, (2) it perfectly represents the single-minded compulsion of the Trekkie faithful, and (3) it was written by a Mac programmer.

The book's author is Phil Farrand, who wrote the Finale music-notation program (disclaimer: he's a pal of mine). One day, while watching "Star Trek: TNG," he noticed something odd: sometimes *Enterprise* personnel have to touch their little lapel-pin communicators before speaking, and sometimes they don't. A little research—and a lot of videocassette watching—revealed to Farrand that the series is riddled with inconsistencies, ranging from accidental reflections of the mike-boom holder to Picard's mispronunciation of alien-race names. (A sequel to the book, documenting similar gaffes in the original series, is in the works.)

Shareware Trekware

I'd be dumb to deny the downloadability of dozens of shareware "Star Trek" programs that Paramount never OK'd. For example, there's Net Trek, Randy Carr's 1987, black-and-white arcade-ish space game you play against as many as four other people on your network. Phaser them before they phaser you!

The highlight of the black-market "Star Trek" racket, though, has got to be David Landis's incredible Star Trek Guide 2.0 stacks for HyperCard. He's created a separate stack for each series: the original, "Next Generation," and "Deep Space Nine." These stacks feature a wowingly complete card for every episode, including title, plot synopsis, air date, guest stars, director, plot lines altered or dropped, mistakes and inside jokes, and so on. Hypertext links take you directly to references from other episodes. You get balloon help, a Find command, report printing, and even a place to note which tape in your collection contains the episode. (Oh, please.)

By the way, it's all free. And it's all in the Macworld area of America Online. Or send three 800K disks and a prepaid mailer to David Landis, 12414 Starlight Ln., Bowie, MD 20715.

Merchandise: The Final Frontier

Almost every company insists that the best "Star Trek" Mac stuff is yet to come. Sound Source is readying disks of video clips from the first six *Star Trek* movies. MacPlay's Star Trek game on CD-ROM, featuring dialogue read by the cast of the original TV show, is supposed to ship in six months. And Paramount, the "Star Trek" company, has big software plans—watch for its "Star Trek: Deep Space Nine" interactive adventure and its CD-ROM Omnipedia.

As if you didn't know, the future of TV and movies holds more "Star Trek." This is, alas, the final season of the instant classic "Star Trek: The Next Generation." But its two spin-off series, "Deep Space Nine" and "Voyager," will no doubt strike similar chords in the hearts of the Mac faithful. Will fonts, games, and mouse pads be spun off from these future shows? Well, you know what Captain Picard would say: "Make it so!" m

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Contributing editor DAVID POGUE's latest book is *More Macs for Dummies*, sequel to his number one Mac best-seller. As an infant, he bonded with his father while watching two TV shows: "Star Trek" and "60 Minutes."



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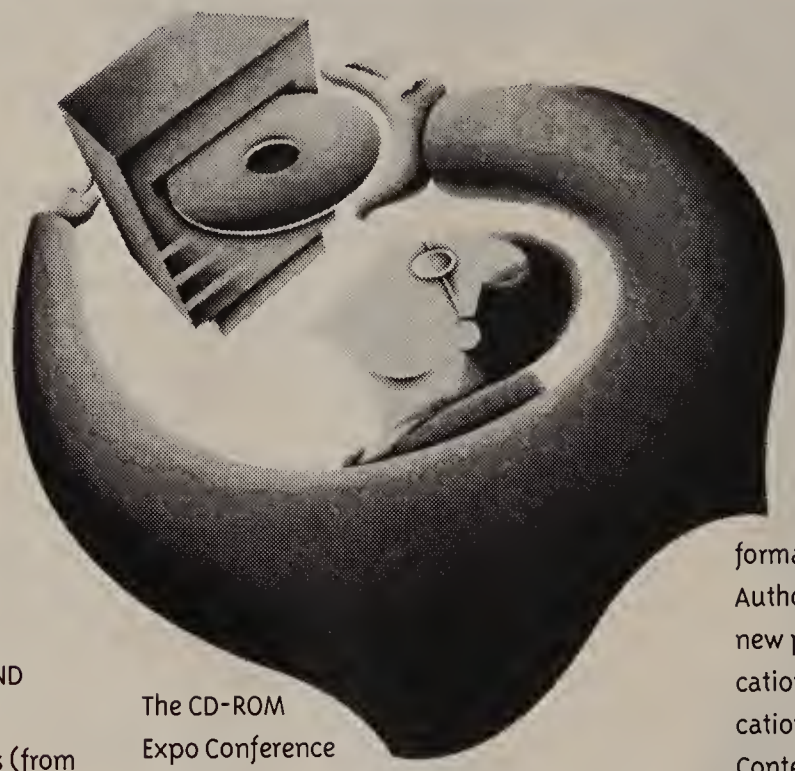
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BY STEVEN LEVY

The Road to Power Macintosh

The story behind Apple's big RISC

IN 1990, JACK McHENRY CONfronted the question that every manager of a computer-design team faces when a project is completed: What next? In the dizzying world of personal computers—particularly at Apple, where some Macintosh models last about as long as a QuickTime video—this is a perpetually vexing conundrum. Any engineer's dream is to develop a machine that represents the company's flagship, a computer that embodies not only marketplace realities, but also the company's future. At Apple, many designers had that dream, leading to an implicit competition that demanded a combination of technical knowledge, soothsaying, corporate politicking, and samurai confidence.

Four years ago McHenry's team was coming off a win—the Macintosh IIfx, considered at the time a paragon of blazing speed and breathtaking power. This costly beast was one of the first salvos in a fusillade of about a zillion new Macintoshes that came out over the next few years, an ascending spiral of more-powerful models based first on the Motorola 68030 microprocessor, then on the 68040. But some motherboard visionaries at Apple understood that this entire family of processors—beginning with the 68000 that was chosen for the original Mac—was essentially a dead end. In order to process computation-hungry stuff like multimedia, telephone, and voice-recognition applications, Apple would need a more powerful chip. A few people thought the answer was to switch to something that used an exotic technology called RISC.

RISC is an acronym for reduced instruction set computer. Regular microprocessors, like those on the 680X0 family, have rich instruction sets that execute many commands. The inventors of RISC figured out that by cutting the instructions to a very few, you could have a faster processor. Sure, in order to perform the instructions that are no longer hardwired onto the chip, you have to run many more instructions using the few you have. But when the smoke clears, things come out faster with RISC.

Still, in 1990 RISC was a radical departure, a promising technology used in very expensive workstations. In 1990 Apple already had a group working on RISC technology: the Jaguar group. Jaguar got its start from a project that put a RISC chip on a board that fit onto a IIfx (the GC board), and now its members were charged with designing a powerful RISC-based computer. The Jaguarians had decided that any Apple RISC computer would have to break cleanly from all previous Macintoshes. In their thinking, the first thing you would do upon switching from the Mac to a new RISC machine was to feed all your software to a neighborhood goat—who would munch on it happily, since it was garbage.



Because this machine would be powerful enough to do all sorts of heretofore impossible things, several technology groups at Apple allied themselves with Jaguar—groups working on projects like interfaces to telephones, audiovisual capabilities, adjustable keyboards, and the voice-recognition system called PlainTalk. By 1990, there were between 30 and 40 people working on Jaguar-related projects.

McHenry's team, however, approached RISC from a different angle. On a group ski trip in March 1991, they made a decision to develop a RISC machine that would be a direct successor to the Macintosh family and would run the current software base. Considering McHenry's attachment to the Mac, this wasn't surprising. In 1984, McHenry had been an experienced 36-year-old Silicon Valley hardware gypsy who was blown away by the introduction of the Macintosh. "From then on, my goal was to go to Apple and design Macintoshes," he says, and that year he began doing just that.

Cognac

McHenry's new project was code-named Cognac, in honor of a RISC pioneer with a surname identical to a particular after-dinner liqueur. The key people on his team included IIfx project holdovers Robert Hollyer and Jonathan Fitch. The latter was also an old Apple hand, having worked on the Lisa.

Cognac and Jaguar, of course, knew of each other's existence. They worked in different buildings, but each kept up on the progress of the other. And each thought the other team was hopelessly misguided. "We thought Jaguar was a second step, not a first step [to RISC]," says McHenry, with some tact. Others are more frank: "We thought their approach was impossible," recalls Jon Fitch. "We viewed Jaguar," says McHenry, "as the evil empire."

continues

But the tension between the two RISC teams was small beer compared with the disquiet that these units sowed within Apple in general. It is easy to see why: there were literally thousands of people within Apple devoted to extending the current operating system—the world of the 680X0—into the next decade and beyond. If either of these two small groups succeeded in moving Apple into the world of RISC, the company would see an upheaval not experienced since the Macintosh overthrew the Apple II. Though little publicized, this drama was the real subplot of Apple's development efforts in the early 1990s.

RISCy Business

The main problem with switching to RISC, of course, lay in the deep investment Macintosh users had in their software. One would expect the vendors of high-volume applications like Microsoft Word or Aldus PageMaker to eventually port their wares over to any new Apple platform. But a lot of Mac software falls into the realm of folkware—quirky applications that may not have won a large audience but help to constitute the overall library that makes the Macintosh so valuable. At best, RISC versions of those applications would be slow in coming; at worst, they might never be attempted. If it couldn't run existing software, a RISC-based computer would be of limited value to Apple's current customers.

While running Macintosh software was not a priority for the Jaguar team, the Cognac team had to figure out how to build a computer that could run both existing programs and the new generation of applications that would be created specifically for the RISC computer. This meant choosing between two alternatives: either using the RISC chip to emulate a previously existing Macintosh, or shipping a two-in-one computer—a RISC machine with a 680X0 Macintosh chip set alongside.

Emulation is no picnic. It often slows a machine down, and who wants to buy an expensive computer that makes your existing software look like it's working underwater? The history of dual-processor machines is littered with failures—no matter how elegantly you package them, they wind up as costly compromises. "Dual processors are a nightmare," says Jon Fitch. "So we were looking for a way not to include a 680X0 chip in the machine."

The breakthrough came late in 1991 when the Cognac team discovered what became known as the 90/10 rule. As McHenry explains, "It turned out that in a typical Mac application, 90 percent of the computing time is spent on 10 percent of the code." This meant that it was theoretically possible to do a very fast emulator—it might be possible to actually produce a machine with only the RISC processor. "We could leave out the 680X0!" says McHenry.

Emulating Mac

It was the Jaguar team that wound up shopping for the chip manufacturer to provide Apple's RISC processor. After a whirlwind tour of every potential RISC provider, including MIPS and even IBM, the Jaguar team wound up making a decision: it would use Motorola chips. Apple execs decided the Cognac team would use the same chips. (The rejected suitors were disappointed, since an Apple adoption of a company's RISC chip would mean a minimum tenfold increase in sales.) Both teams continued working independently. Cognac's hardware design progressed, and in late 1990, the team reached what's called gray screen (the point at which a prototype, its circuitry working, lights up a monitor). Still, the team knew that its efforts would be wasted if the Macintosh emulation was sluggish. "If there was a [speed] penalty in buying this over the 680X0 Mac, we couldn't do it," says Jon Fitch.

The man charged with producing the Cognac emulation scheme was an engineer named Gary Davidian. Before coming to Apple and working on various ROM toolboxes, he had been an experienced microcoder—a person who writes directly to the high-speed instruction sets on microprocessors. When Davidian joined the Cognac team, the Motorola decision had not been made, so every couple of weeks he was writing a new emulator, depending on the RISC chip du jour. It was not easy, making those chips pretend they were 68000s, but as he progressed he learned many tricks. By the time the group settled on Motorola in 1991, Davidian was ready to apply all his knowledge. By midyear, he had an emulator that ran inside a Macintosh LC box using a RISC chip—look, Ma, no 68000! The RISCified LC, which they called RLC, accepted off-the-shelf Macintosh software and ran it at speeds comparable to a Mac II.

"The RLC worked great—it blew away the company," says McHenry. It emulated almost everything that ran on the Mac—not only the new things but some of the earlier software as well. One particularly triumphant moment was the Cognac team's demonstration to the Jaguar team in late 1991. The Jaguar engineers attempted to break the emulator with offbeat software—they even dug up some ancient 400K floppies to stump the RISC machine. But the RLC maintained its charade that it was a 68000 computer. And when the RISC machine ran software written specifically for its processor, it churned out Mandelbrot fractals at dizzying speeds.

The success of the RLC prototype was a real milestone on the road to RISC. "Until then, people didn't think it was possible," says Wayne Meretsky, who was then a Jaguar engineer. "They didn't understand that the limited instruction set could do all that."

Deal with the Devil

As the Cognac team produced more prototypes—by 1992 they had an RLC running the Finder in a Macintosh IIsi box—Apple's executives were busy with another matter entirely. John Sculley and his colleagues had begun negotiations regarding a joint venture with Apple's former blood enemy: International Business Machines. Ironically, one of the things that first brought Apple and IBM together was the Jaguar team's search for a RISC chip. Once that back channel was opened, it turned out that Apple and IBM officers had plenty to talk about (maybe they discussed how they hated Bill Gates). In the summer of 1992, after months of top-secret discussions, the companies made an announcement: they would work together on several projects, the most important of which would be the development, working together with Motorola, of a new microprocessor that would be the heart of new machines from Apple and IBM. The chip would be called PowerPC. And it would be a RISC chip.

Apple people called it, with a measure of mockery, The Deal of the Century. As far as Cognac was concerned, it meant at the least a retooling of its emulation scheme—using a chip that literally hadn't been designed yet. Even more daunting, the team had to bring on software wizards to develop an entirely new operating system built around this vapor processor. The PowerPC itself would be a collaboration between companies with cultures so different that some doubted that anything at all could come from it. (Picture Roy Cohn and Alger Hiss sharing a soldering iron.) And all of this had to be completed to meet an incredibly tight deadline—January 24, 1994, the tenth anniversary of Macintosh!

What happened next? See next month's column to learn how Apple met the challenge. **m**

STEVEN LEVY's latest book is *Insanely Great: The Life and Times of Macintosh, the Computer That Changed Everything* (Viking, 1994).

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Software Shopping by CD-ROM

Electronic catalogs want your business

GONE ARE THE DAYS WHEN we bought all our software at computer dealers. Superstores and mail-order companies now do brisk business. But a new rival has come to town in the form of electronic software catalogs on CD-ROM. The idea itself is simple: pack product info and demos onto a CD-ROM so Mac owners can try a program before buying it. Give users access to an 800 number they can call to buy the software by exchanging their credit card number for a password that unlocks the program they want to download.

Apple Computer (800/937-2828) and MacZone (800/684-8080) say speed and ease of use are the main benefits of buying via CD-ROM. KidSoft (800/354-6150) says children won't know if they like a program unless they use it, and a CD-ROM lets kids try out programs they can't play with at dealers. Is buying by CD-ROM that quick and easy? Here's what I found by buying software (using a pseudonym) from all three companies.

Interface Tales

Apple's Software Dispatch and MacZone's Instant Access have very different interfaces. Software Dispatch has a nifty QuickTime movie designed to make users feel all warm and fuzzy by explaining how the system works. (Too bad the movie launches every time you use the disc.) The interface is boring but quite functional—a black-and-white format that mimics the Finder in System 7, with triangles that you click on to see more detail.

You can navigate Software Dispatch by product name, company name, category, or price. What you can't do is exit from the initial screen—you must click on Shopping or Special Offers before you can quit the program. You can view product "guided tours" directly from the CD-ROM. Users must copy product demos to a hard drive to use them.

Instant Access has a more attractive color interface but a far less useful navigation system. You can search by product name, if you know it; or you can browse category by category, which can be time-consuming. The search engine isn't always reliable: Advanced Software's In-Touch has two entries, for example, but the find function only located one.

Several operations that could be automatic aren't. You can't take IA's guided tours directly; you must copy them to a hard drive, which takes time and space. (Another small annoyance was IA's insistence on returning to the top level of my hard drive whenever I copied a guided tour or product demo, instead of going to the folder set up for such purposes.)



Navigating the first KidSoft CD-ROM is also a click-heavy experience. (The next version should be easier to negotiate.) You can search for software by its target age group, but there's no simple list of products to scroll. KidSoft is fun, though, because it also offers several small entertainments for children, such as connect-the-dots exercises and picture matching. Applause and *aahs* rewards the successful gamester. KidSoft's interface is clean, colorful, and direct. And sometimes annoying—you can quit only from the first screen. However deep you are in the program, you have to click on arrows until you get back to the beginning.

Apple's first Software Dispatch is kind of a stealth application. Extensions and other necessary files are copied into the user's System Folder without warning. This obviously irritated early users, who didn't know what to remove to resolve any compatibility problems. (Apple says the next version will inform users what is being copied to their hard drives.)

Instant Access warns you when the application must add files to the System Folder. But that doesn't avoid all compatibility problems. The first IA disc I received didn't work. The MacZone employee who tried to help seemed shocked to hear that I was attempting to run it on a Mac running system extensions and other apps at the same time. (The replacement disc gave me no compatibility problems.)

KidSoft avoids the compatibility issue: it leaves your System alone.

Operators Are Standing By

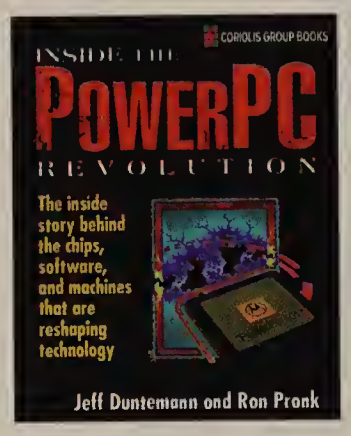
All three CD-ROMs follow a similar path once your lust for acquisition has been ignited. Software Dispatch users hit the Add to Order button to create a shopping list. Up comes a license agreement for the product, which you must approve before you can proceed. Clicking on Place Order brings up an order form with the product number, name, price, and status (locked), along with the 800 number to call for ordering. If you try to quit with unpurchased products, the program asks if you want to retain the shopping list. If you

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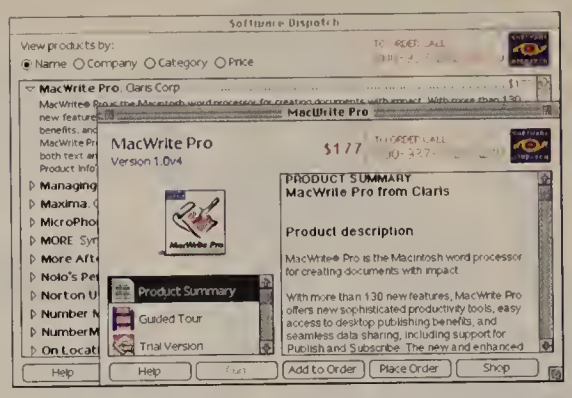
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answer yes, Software Dispatch copies that information to your hard drive.

Instant Access doesn't maintain a shopping list on your hard drive automatically; you must save a Purchases folder to your hard drive. If your purchase is interrupted after you create the Purchases folder, IA prompts you to save the same folder again, which you can't do, because one already exists with that name. If you successfully purchase a product and want to buy another, the same maddening thing happens—you must first delete or rename the old Purchases folder.

Apple, an avid collector of demographics, requires its Software Dispatch operators to ask whether you use your computer in a home, school, government, or business setting before allowing you to place an order; at the conclusion of the transaction the operator asks you to take part in a voluntary survey. In between, the operator takes credit card and order information and then provides a code for unlocking the software. A Purchases shopping bag shows up on your desktop with the program, which has been downloaded to your hard drive. *Telephone time elapsed: 11 minutes, 31 seconds.*

The MacZone folks weren't as nosy as Apple when I called, but they weren't nearly as efficient, either. To buy via Instant Access, you must call one of MacZone's general operators, who then transfers you to an IA specialist. The first time I called, no IA operators were available. On my second try, about 70 minutes later, I was transferred to the wrong person, put on hold, transferred to the right person, and put on hold. It was nearly 6 minutes before someone began to take my order.

During my call, the IA operator startled me by saying, "Keep your mouse moving—it's one of the things that can cause it to crash." He was entirely serious, so I kept the cursor moving while I waited, and waited, for the IA database to spit out the code for unlocking the program I was buying. *Telephone time elapsed: 17 minutes, 31 seconds.*

My KidSoft experience was a marvel of efficiency by comparison. The process was surprisingly quick, considering that the Express Checkout screen completely baffled me. There were no instructions and several blank windows. Even so, in less than 5 minutes I was able to give my product info to the operator and get the secret code to unlock my program. *Telephone time elapsed: 4 minutes, 57 seconds.*

Since CD-ROMs compete most directly with mail-order companies, I called MacZone to see how ordering a program via mail compared with my CD-ROM experiences. No contest, really. I asked to buy a program, it was in stock, the operator took the information, and I was off the phone in a relative flash. *Telephone time elapsed: 3 minutes, 13 seconds.*

Of course, the comparison isn't entirely fair. People can't easily play with demo software over the phone lines—at least not yet. And I did have to wait for my program to arrive by mail. But some of the programs on CD-ROM require serial numbers that are tied to manuals, so customers must wait until the manuals arrive before using their programs. And many programs don't come with demos. Finally, the selection remains fairly limited. Large computer dealers may stock 200 or so Mac titles; major mail-order companies stock more than ten times that number. The number of applications available via CD-ROM is far smaller.

Promising but Premature

None of the CD-ROMs provide any reviews or product comparisons, so it's hard for users to evaluate differences between similar programs. And since each program's developer provides the product specs and presentations, any drawbacks in the application aren't publicized. All three companies will refund your money if you have problems with the software you purchase and meet certain conditions. Prices for software bought via CD-ROM are competitive with mail-order prices—and just as subject to change.

Users who already know what they want will not benefit from these discs. People who want to try the demos or get basic information may enjoy using them. But if you need advice or want more in-depth information, this magazine and the experienced staff at a computer dealer, superstore, or mail-order company will probably be much more helpful.

Software distribution via CD-ROM may look promising, but it's not yet ready to rock and roll. **m**

Send nominees for sainthood to *Service Heroes, Macworld,* 501 Second St., San Francisco, CA 94107, or via Internet at Branscum@AOL.com. Conversely, drop *Conspicuous Consumer* a line if a company is ignoring you.

DAYSTAR DIGITAL

66MHz PowerPro 601

SPECIAL

Quantum

3.5" Hard Drives

PowerSTOR	Internal	External
170MB LPS	$269	$329
340MB LPS	$289	$349
540MB LPS	$479	$539
1080MB Emp	$859	$919
1800MB PDr	$1139	$1199

2.5" Hard Drives

170MB GDGLS	$249
256MB GDGLS	$349

Includes FWB Personal Tool Kit FWB

Toshiba

CD-ROM Drive

PowerCDDS

Dual Speed External	$499

Epson

3.5" Optical Drive

PowerMO

128MB External w/cart	$799
128MB Cartridge	$49

Includes FWB Personal Tool Kit FWB

SyQuest

5.25" Removable Drives

PowerSyQuest

44/88cMB Ext w/cart	$499
44MB Cartridge	$65
88MB Cartridge	$99

3.5" Removable Drives

105MB External w/cart	$499
105MB Cartridge	$59
270MB External w/cart	$699
270MB Cartridge	$95

Includes FWB Personal Tool Kit FWB

Wang

3.5" DAT Drive

PowerDAT

16G1G External w/tape	$1299
120 meter DAT Tape	$35

Includes Retrospect by Dantz

DAYSTAR DIGITAL

Power PC Accelerators

with Apple Licensed PowerPC ROMs

66MHz PowerPro 601	$Call
80MHz PowerPro 601	$Call
FastCache PowerPro	$Call

Turbo 040 Accelerators

25MHz Turbo 040	$639
33MHz Turbo 040	$909
33MHz Turbo 040 wFC	$989
40MHz Turbo 040	$1069
40MHz Turbo 040 wFC	$1649

Turbo 040i Accelerators

20MHz Turbo 040i	$579
25MHz Turbo 040i	$659
33MHz Turbo 040i	$749
33MHz Turbo 040i wFC	$829
Image 040	$1809
Quad 040	$1399

PhotoShop

PhotoMatic	$189

SUPERMAC

Color Displays

PressView 21	$3289
SuperMatch 17T	$1049

Graphics Cards

ThunderStorm Deluxe	$419
Thunder • 1360	$2309
Thunder GX • 1360	$2719
Thunder II Lite	$1699
Spectrum Pwr • 1152	$1179

Digital-Video Systems

Digital Film	$3219

E-MACHINES.

Color Displays

T-16II	$1289
T-20	$2479

Graphics Cards

Futura SX	$359
Futura II LX	$779

Farallon

Please call for current prices on our new line of EtherWAVE networking products

radius

Color Displays

Intellicolor 20	$2659
Precision Color Pivot	$789
Full Page Display	$489

Cards

Photo Booster	$779
SCSI 2 Booster	$259
PrecisionColor Pro 24x	$1979
PrecisionColor 24x	$1539
PrecisionColor 24xk	$769
PrecisionColor Pro 24xp	$469
Video Vision Basic	$1559
Video Vision Studio	$3499

Global Village

Desktop Modems

TelePort Mercury	$329
TelePort Gold	$279
TelePort Silver	$259
TelePort Bronze II	$99

PowerBook Int. Modems

PowerPort Mercury	$329
PowerPort Gold	$279
PowerPort Silver	$259
PowerPort Bronze	$99

Supra Modems

SupraFax 14.4v32bis	$219
SupraFax 14.4LC	$155
SupraFax 14.4PB	$275

SONY

Color Displays

17" CPD1730	$999
17" CPD17SE1	$1199

If you don't see it here please call and we will be happy to give you a price.

Apple

Q840av 8/230 wCD	$3819.00
Q840av 8/230	$3519.00
Q650 8/230 wCD	$2739.00
Q650 8/230	$2399.00
Macintosh 16"	$1259.00
Macintosh 14"av	$729.00
Macintosh 14"	$519.00
Apple Std keyboard	$99.00
Apple Ext keyboard	$159.00
Apple CD 300e	$419.00

Memory

8 bit SIMMs

1MB 70ns 80ns	$45
1MB fx 80ns	$43
2MB 80ns	$78
4MB 80ns	$164
4MB II/IIx 80ns	$167
4MB fx 80ns	$160
8MB 70ns	$325
8MB Q700 70ns	$319
8MB fx 70ns	$339
16MB 70ns	$668
16MB fx 70ns	$676
16MB Q700 70ns	$623

32 bit SIMMs

4MB 60ns/80ns	$149
8MB 60ns/80ns	$329
16MB 60ns/80ns	$679 $619
32MB 60ns/80ns	$1309 $1489

Video SIMMs

256k 512k 80ns	$22/$35

PowerBook SIMMs

PowerBk100

2/4/6MB	$89 $199 $259

PowerBk140/145/145B/170

4/6MB	$189 $273

PowerBk165c/180c

6/8/10MB	$254 $329 $349

PowerBk160/165/180

6/8/10MB	$253 $339 $419

PowerBk210/230/250/270C

4/8/14MB	$175 $309 $639
18/20MB	Please Call

SIMM prices fluctuate daily Please call for current pricing

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Circle 200 on reader service card

FIFTH ANNUAL

Digital World

Don't Be Left Behind.

Suddenly and surprisingly, the markets for digital media and digital communications are exploding before our very eyes. This year is critical. The information superhighway, multimedia, interactive television and video dial tone — the exclusive domain of "visionaries" a few short months ago — are being defined and decided upon **right now**.

Blink, and you'll miss an opportunity to help shape and profit from a revolution that will challenge the very foundations of how we inform and entertain ourselves.

For the past four years, the place to gain insight on these changes has been Seybold's Digital World Conference and Exposition. This year, 20,000 executives, producers, artists and technologists will gather at the Los Angeles Convention Center June 6-8. Their purpose is to set the digital agenda for 1994 and beyond.

Special Events at Digital World 94:

Join leading writers, directors, producers and other creative professionals at the Creative Cafe, the new interactive media gathering place, sponsored by the Writers Guild of America, West. Visit the Creative Marketplace, a special showcase for content developers, publishers, designers and programmers.

Experience the top 25 interactive media products from around the world at the inauguration of the Interactive Media Festival (IMF).

The Digital World Conference will again be an intimate gathering of the elite shaping the digital revolution.

Call 1-800-468-3767 for details on programs and speakers. To exhibit, call Mary Arlotto at 415-578-6935.

Register me now for the Digital World 94 Expo.

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Title _____ Company _____

Address _____

City _____ State _____ Zip _____ Country _____

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Fax or Mail to: DW 94, 303 Vintage Park Drive, Foster City, CA 94404 Fax: 415-525-0198

> **"The turn-out [at Digital World] is so high because the realization is dawning that the entertainment industry will be one of the most significant forces behind any near-term success high-tech companies might have in creating things like interactive television."**
>
> ***San Jose Mercury News 6/24/93***

June 6-8, 1994 • Los Angeles Convention Center • Los Angeles, California

Editors' Choice

THE BEST PRODUCTS FEATURED IN MACWORLD

Edited by Susan Grant-Marsh

Macworld Editors' Choice is a complete listing of the hardware and software products selected as the best of their type in *Macworld*'s comparative articles. A ✣ next to a product indicates that we chose more than one product in that category.

Hardware

MONITORS

BLACK-AND-WHITE MONITORS, May 93
Portrait monitor: 15-Inch Gray Scale Portrait Display; Mirror Technologies, 612/633-4450; $399, with video-display board $549.
Two-page monitor: ✣ L-View MultiMode; Sigma Designs, 510/770-0100; $1099, with video-display board $1398. ✣ MD 202 Two Page Display; Mobius Technologies, 510/654-0556; $699, with video-display board $798.

COLOR MONITORS, Oct 93
16- and 17-inch: ✣ ErgoView 17; Sigma Designs, 510/770-0100; $1349
✣ MultiSync 5FG; NEC Technologies, 708/860-9500; $1355 (NEC's estimated dealer price).

GRAY-SCALE MONITORS, May 93
Portrait monitor: Pivot Display; Radius, 408/434-1010; $849, with video-display board $1148.
Two-page monitor: MultiMode 120, SilverView Pro; Sigma Designs, 510/770-0100; $1099, with video-display board $1299

SMALL COLOR MONITORS, Jan 94
14-inch display: ✣ Sony CPD 1430; Sony Corp. of America, 800/222-7669; $779.95. ✣ Nanao FlexScan F340i•W, Nanao USA, 800/800-5202; $799
15-inch display: NEC MultiSync 4FGe; NEC Technologies, 708/860-9500; estimated street price $755.

NETWORK HARDWARE

HARDWARE ROUTERS, Jul 93
Under $1500: EtherRoute, Compatible Systems, 303/444-9532, base model $1495 (no TCP/IP support)
Between $1500 and $3500: InterRoute/5, Farallon Computing, 510/814-5000; $3299 to $3499

HIGH-SPEED FAX MODEMS, Oct 93
Teleport Gold and Silver with Global Fax, Global Village Communication, 415/390-8200 Gold $499, Silver $429

POWERBOOK TOOLS

DUO DOCKING CONNECTORS, Feb 93
PowerLink DeskNet; E-Machines, 503/646-6699; $699.

EXTERNAL HARD DRIVES, Feb 93
✣ Companion 120; APS Technologies, 800/874-1428; $599. ✣ PocketDrive 120MB; La Cie, 503/520-9000; $699.

INTERNAL FAX MODEMS, Feb 93
✣ PowerModem series; PSI, 408/559-8544; $195 to $495. ✣ PowerPort series; Global Village Communication, 415/390-8200; $229 to $499.

PRINTERS

COLOR PRINTERS, May 93
Dye-sublimation: ✣ ColorStream/DS; Mitsubishi International, 408/980-1100; $9950. ✣ Phaser IISD Color Printer; Tektronix, 503/682-7377; $9995.
Thermal-wax: ✣ ColorScript 210; QMS, 205/633-4300; $4995. ✣ Personal ColorPoint PSE; Seiko Instruments, 408/922-5800; $2999.
Low-end liquid-ink: HP DeskWriter 550C; Hewlett-Packard, 800/752-0900; $1099.
Midrange liquid-ink: HP PaintJet XL300; Hewlett-Packard, 800/752-0900; $3495.
Solid-ink: Phaser III PXi Color Printer; Tektronix, 503/685-3585; $9995.

PERSONAL PRINTERS, Sep 93
Ink-jet: StyleWriter II; Apple Computer, 408/996-1010; $359.
PostScript laser: TI microLaser Series; Texas Instruments, 512/250-6679; $1199 to $1599.
QuickDraw laser: LaserWriter Select 300; Apple Computer, 408/996-1010; $839.

WORKGROUP PRINTERS, Feb 94
High-speed: Hewlett-Packard 4Si MX; Hewlett-Packard, 800/752-0900; $5499.
Best buy: ✣ Apple LaserWriter Pro 630, Apple Computer, 408/996-1010; $2529 ✣ Hewlett-Packard LaserJet 4M; Hewlett-Packard, 800/752-0900; $2329.

SCANNERS

LOW-COST COLOR SCANNERS, Nov 93
$1300 to $1600: ✣ La Cie Silverscanner II; La Cie, 503/520-9000; $1599 ✣ Hewlett-Packard ScanJet IIc; Hewlett-Packard, 800/752-0900; $1599.
Under $1300: Mirror 800 Plus Color Scanner, Mirror Technologies, 612/633-4550; $1299

OCR, Nov 93
OmniPage Professional; Caere Corp., 408/395-7000; $995.

SYSTEMS/STORAGE

DOUBLE-SPEED CD-ROM DRIVES, Jul 93
Sheer speed: Pioneer DRM-604X; Pioneer, 408/988-1702; $1795.
Overall value: AppleCD 300; Apple Computer, 408/996-1010; $599.
Budget choice: NEC MultiSpin 38; NEC Technologies, 708/860-9500; $465

HIGH-SPEED HARD DRIVES, Aug 93
2.7GB drives: ✣ Nova XL 2700; Microtech International, 203/468-6223; $2999. ✣ Vista 3.5GB; Relax Technology, 510/471-6112; $3499.
SCSI-2 adapter: QuickSCSI; PLI, 800/288-8754; $499.

MACINTOSH UPGRADES, Jun 93
Classic accelerator (40MHz): TransWarp Classic; Applied Engineering, 214/241-6060; $798 (with FPU).
SE accelerator (25MHz): Quik30; Novy Systems, 904/427-2358; $449 (without FPU).
SE/30 accelerator (50MHz or 33MHz): Universal PowerCache; DayStar Digital, 404/967-2077; 50MHz $999 (with FPU), 33MHz $449 (without FPU).
LC and LC II upgrades: Macintosh LC III Logic Board Upgrade; Apple Computer, 408/996-1010; $599.
Mac II accelerators: ✣ Radius Rocket 25i, Radius Rocket 33; Radius, 408/434-1010; 25i $1199, 33 $2499. ✣ Universal PowerCache series; DayStar Digital, 404/967-2077; $449 to $999.
IIfx SCSI accelerator: QuickSCSI; PLI, 800/288-8754, $499.
Quadra static-RAM cache card: FastCache Quadra, DayStar Digital, 404/967-2077; $299 for Quadra 700 and 900, $449 for Quadra 800 and 950

MIDRANGE HARD DRIVES, Mar 93
Low-capacity drive: La Cie Cirrus 240; La Cie, 503/520-9000; $769
Notable technology: DiamondDrive 510; Mass Microsystems, 408/522-1200, $2089
Bargain: APS Fujitsu 520; APS Technologies, 800/874-1428; $1149
All-around quality: hammer 525FMF, FW8, 415/474-8055; $2799.

OPTICAL DRIVES, Dec 93
3½-inch: ✣ Epson OMD 5010 ClubMac 800/258-2622, $959 ✣ 128 MO APS Technologies, 800/874-1428, $899

continues

MACWORLD Editors' Choice

5¼-inch: ✣ Sharp JY-750; ClubMac, 800/258-2622; $1829. ✣ Infinity MaxOptical 11m; PLI, 800/288-8754; $4113.

VIDEO/DISPLAY

24-BIT VIDEO CARDS, Apr 94
Inexpensive acceleration: PrecisionColorPro 24XP; Radius, 408/434-1010; $599.
Full-featured acceleration: Thunder II GX•1360; SuperMac Technology, 408/541-6100; $4499.

COLOR LCD PROJECTION, Jan 93
Display panel: MediaPro; nView Corp., 804/873-1354; $7995.
Low-end panel: TFT Rainbow HD Model 700; Chisolm, 408/559-1111; $5295.
Complete LCD projector: System 6000; In Focus Systems, 503/692-4968; $8495.

PHOTOSHOP ACCELERATORS, Apr 94
PhotoBooster; Radius, 408/434-1010; $999.

VIDEO-CAPTURE BOARD, Jan 93
VideoSpigot; SuperMac Technology, 408/541-6100; $449 to $1399, depending on bundling options.

Software

ACCOUNTING/FINANCE

GROWING A SMALL BUSINESS, Nov 93
Small-business system: M.Y.O.B.; Teleware, 201/586-2200; $199.
Home office/personal finance: MacMoney; Survivor Software, 310/410-9527; $119.95.

PERSONAL FINANCE, Jun 93
✣ CheckWriter 4.0; Aatrix Software, 701/746-6801; $79.
✣ Andrew Tobias' Managing Your Money 5.0; MECA Software, 203/256-5000; $79.95.

BUSINESS TOOLS

STATISTICS, Oct 93
Exploratory data analysis: DataDesk 4.1; Data Description, 607/257-1000; $595.
Comprehensive package: SYSTAT 5.2.1; SYSTAT, 708/864-5670; $895.

CD-ROM

TOP 10 CD-ROMS, Mar 94
Overall: Seven Days in August; Time Warner Interactive Group, 818/955-9999; $79.99.

COMMUNICATIONS/NETWORKS

HIGH-SPEED FAX MODEM SOFTWARE, Oct 93
Faxstf, Telefocus, 816/886-9800; $79.

NETWARE CONNECTIVITY, Sep 93
NetWare for Macintosh; Novell, 801/429-7000; $495 for 5-user license to $2295 for 200-user license.

SOFTWARE ROUTER, Jul 93
Apple Internet Router 3.0; Apple Computer, 408/996-1010; Basic Connectivity Package $499.

TERMINAL EMULATOR, Oct 93
VersaTerm; Synergy Software, 215/779-0522; $149.

GRAPHICS

2-D CAD, Jan 93
Low-end: BluePrint; Graphsoft, 410/461-9488; $295.
Midrange: PowerDraw; Engineered Software, 919/299-4843; $795.

3-D DESIGN, Aug 93
Price for performance: ✣ Ray Dream Designer 2.0.4; Ray Dream, 415/960-0765; $299. ✣ Alias Sketch 1.5; Alias Research, 416/362-9181; $995.
All-in-one solution: ✣ Infini-D 2.5; Specular International, 413/253-3100; $695. ✣ StrataVision 3D 2.6.1; Strata, 801/628-5218; $995.

CLIP ART'S GREATEST HITS, Jan 94
Overall collection: ✣ ClickArt Studio Series; T/Maker Company, 415/962-0195; $99.95 per volume. ✣ Electronic Clipper subscription service; Dynamic Graphics, 800/255-8800; $67.50 per month. ✣ Metro ImageBase Electronic Clip Art; Metro ImageBase, 800/525-1552; $74.95 per volume, CD-ROM $149.95. ✣ Images with Impact series; 3G Graphics, 800/456-0234; $99.95 to $129.95 per volume, CD-ROM $499. ✣ Typographers' Ornaments; Underground Grammarian, 609/589-6477; $25 per volume; ten TIFF albums $200; EPS volumes $50 each.

DRAW PROGRAMS (LOW-COST), Sep 93
Budget draw: Expert Draw; Expert Software, 305/567-9990; $49.95.
Budget draw/paint: UltraPaint; Deneba Software, 305/596-5644; $79.
Beginners' program: Aldus SuperPaint; Aldus Corp., 619/558-6000; $149.95.
Overall: Canvas; Deneba Software, 305/596-5644; $399.

FONT BUYERS' GUIDE, Mar 94
Text-face collection: Type On Call CD-ROM; Adobe Systems, 415/961-4400, 800/682-3623; $99 (includes the ability to unlock two families from preselected packages) plus $25 to unlock individual faces or $69 to $179 for unlocking families.
Display/decorative-face collection: Fontek; Letraset, 201/845-6100; $39.95 per face.
Bargain collection: Monotype ValuePack; Monotype, 312/855-1440; $89 for 57 fonts.

Vendors: Please write to Macworld Editors' Choice, 501 Second St., San Francisco, CA 94107, or send a fax to 415/442-0766 to inform us of changes in your phone number or your product's list price.

IMAGE DATABASES, Oct 93
✣ Aldus Fetch 1.0; Aldus Corp., 206/628-5739; $295.
✣ Multi-Ad Search 2.0; Multi-Ad Services, 309/692-1530; $249.

PAINT AND IMAGE-EDITING, Sep 93
Budget buy: Expert Color Paint; Expert Software, 305/567-9990; $49.95.
Overall program: Fractal Design Painter; Fractal Design Corp., 408/688-8800; $399.
Image-editing program: Adobe Photoshop 2.5.1; Adobe Systems, 415/961-4400; $895.

INTEGRATED SOFTWARE

INTEGRATED SOFTWARE, Feb 94
ClarisWorks; Claris Corporation, 408/727-8227; $299.

ORGANIZATION/PRODUCTIVITY

CALENDARS, Jul 93
Alarm system: ✣ First Things First; Visionary Software, 503/246-6200; $79.95.
✣ Smart Alarms Plus; JAM Software, 203/630-0055; $75.
All-around scheduler: Now Up-to-Date; Now Software, 503/274-2800; $99.
Meeting scheduler: Meeting Maker; On Technology, 617/374-1400; five-pack $495.

SALES-AUTOMATION SOFTWARE, Oct 93
✣ Contact Ease; WestWare, 619/660-0356; one user $395, five users $1495.
✣ CBS; Colleague Business Software, 512/345-9964; $495.

TEXT-RETRIEVAL SOFTWARE, Dec 93
Small system: On Location; On Technology, 617/374-1400; $129.
Multiuser system: Personal Librarian; Personal Library Software, 301/990-1155; $995.

PRESENTATION TOOLS

MULTIMEDIA AUTHORING, Mar 93
Entry-level: ✣ Action; Macromedia, 415/252-2000; $495. ✣ Passport Producer; Passport Designs, 415/726-0280; $495.

UTILITIES

BRAVE NEW DOCUMENTS, Jan 94
Application-independent document distribution: Common Ground; No Hands Software, 800/598-3821; $189.95.
Book-length documents: FrameReader; Frame Technology, 800/843-7263; $84.95.

PRINTING, Sep 93
PC-printer cable packages: PowerPrint; GDT Softworks, 604/291-9121; $149. m

Star Ratings

OVER 350 HARDWARE AND SOFTWARE REVIEWS AT A GLANCE

Edited by Wendy Sharp

Macworld Star Ratings lets you compare hardware and software products for the Macintosh by providing summaries of hundreds of *Macworld*'s authoritative product reviews. The number of stars at the beginning of each capsule review indicates quality; our reviewers assign five stars to outstanding products and one star to poor ones.

If a product has been upgraded since our last review, the most recent version number supplied by the vendor appears in parentheses after the reviewed version number. To read a full review of any product in the listing, please consult the issue listed at the end of each synopsis.

Vendors. Please write to *Macworld Star Ratings*, 501 Second St , San Francisco, CA 94107, to inform us of changes in the version number or list price of your product, or of changes to your phone number

Software

BUSINESS TOOLS

★★★ **4D Server 1.0.1 (1.0.5), ACI US, 408/252-4444, $1495 to $3495.** Database server uses the ingenious multitasking technology built into 4D to make it appear that each client has the full resources of the server. If you use 4D on a network, you need this product. Jun 93

★★★★ **4th Dimension 3.0.1 (3.0.5), ACI US, 408/252-4444, $895.** Multitasking, which greatly improves speed, makes this upgraded relational database delightful for both developers and end users For a relational database, it's impressively easy to use. Apr 93

★★ **AccuZip6 1.5.2 (1.8.5), Software Publishers, 800/233-0555, $689.** Professional-level mail-list-management tool on CD-ROM is the most comprehensive system available, but its inexcusable user-interface violations make our reviewer reluctant to recommend it May 93

★★★ **Acrobat Exchange, Acrobat Distiller, Adobe Systems, 415/961-4400, $195 to $2495.** Complete, well-planned paperless office system creates application-independent viewable files that can be readily distributed on a network Still, it's not yet as inexpensive or as convenient as you might wish. Oct 93

★★★ **@Risk 1.1, Palisade Corp., 607/277-8000, $395.** Statistical simulator for Microsoft Excel financial computations generates complex, statistically valid templates within Excel and is the first choice for analysts who work with probabilistic models every day. It assumes that the user is an Excel power user Aug 93

★★★★ **ClarisWorks 2.0, Claris Corp., 408/727-8227, $299.** Integrated program provides more features, is easier to use and faster and has better integration among modules than other available programs Aug 93

★★★★ **Common Ground 1.0, No Hands Software, 415/802-5800, $189.95.** Simple, robust document-interchange system is the clear choice for modest document-distribution jobs. In tests, it worked easily with documents from many different applications. Oct 93

★★★ **Cricket Graph III 1.5, Computer Associates International, 516/342-6000, $129.** Basic and foolproof charting program produces cleaner charts than Excel with little effort, although its feature set is fairly modest. Apr 94

★★★★ **DeltaGraph Pro 3, DeltaPoint, 408/648-4000, $195.** At its new lower price, this charting program is the best feature-for-feature value in Macintosh charting. There's even a new Chart Advisor function that suggests the appropriate display for your data. Apr 94

★★ **EasyFlow 1.1, HavenTree Software, 613/544-6035, $229.** The rough edges and distinctly un-Mac-like attributes of this flowcharting software reflect its DOS heritage, but on the whole it's easy to use. Sep 93

★★★ **Helix Express 1.0 (2.0), Helix Technologies, 708/465-0242, $439.** This relational database has an iconic programming language that sometimes baffles programmers, but provides an easy route into basic data-handling for nonprogrammers. Jul 93

★★★ **Helix Tracker 1.0, Helix Technologies, 708/465-0242, $439.** Well-designed workgroup-document manager has strong audit and annotation features; imposes just the right amount of administrative discipline. For large documents, however, Ethernet will look mighty attractive. Nov 93

★★★ **ithink 2.2.1, High Performance Systems, 603/643-9636, $695.** Although it requires a real training commitment for effective use, this product is an attractive dynamic business modeling system. It's a good bet for identifying cloudy spots in the crystal ball. May 93

★★ **Lotus Notes 3.0, Lotus Development Corp., 617/577-8500, $495 per client.** Well-organized, robust, and flexible business data system demands a full-time administrator, preferably with considerable programming experience, for effective use. Sep 93

★★★ **MacBarcoda 2.2.4, ComputaLabel, 508/462-0993, $349 to $895.** Simple-to-use desk accessory creates bar codes in EPS or Adobe Illustrator 1.1 format. DA cannot automatically create serial codes. Jun 93

★★★ **MacProject Pro 1.0 (1.5), Claris Corp., 408/727-8227, $599.** If you're working on a midsize project and like using PERT charts, this may be the project-management software for you. However, the multistep scheduling process and the limited integration between charts are frustrating if you prefer Gantt charts. May 93

★★★★ **MarcoPolo 2.0, Mainstay, 805/484-9400, $395.** Inexpensive, easy-to-use product allows you or your workgroup to archive and retrieve documents, whether in electronic or paper form Queries are easy to construct and searches are handled quickly Sep 93

★★★ **Market Master Manager 3.5, Breakthrough Productions, 916/265-0911, $395 to $1995.** Sales-automation software is designed to keep track of contacts, generate mailings, and make sure that leads don't fall through the cracks. It includes a remote module, but it has some odd user-interface features. Oct 93

★★ **Memorizer 2.0, Brains Software Engineering, 432-231-28973 (Austria), $100.** Software records dictation, and you transcribe the dictation in a word processor. You may prefer to stick with a hand-held tape recorder, considering the product's RAM and storage appetite and its propensity to crash. Aug 93

★★★ **Micro Planner Manager 1.1, Micro Planning International, 303/757-2216, $695.** When you require cross-project resource sharing and leveling for a reasonable price, this project-management software has the edge. It has a generally intuitive interface, though there's a steep learning curve for its advanced features. Nov 93

★★★★ **Microsoft FoxPro for Macintosh 2.5, Microsoft Corp., 206/882-8080, $495.** Dazzlingly fast and easy-to-use relational database has a greatly improved interface and cross-platform compatibility. For projects of 4 to 20 users and large amounts of data (hundreds of thousands to millions of records), it offers excellent performance. Apr 94

★★★ **Office Tracker 1.1, Milum Corp., 512/327-2255, $195 to $995.** The efficient user interface of this software sign-out board, in both single-user and networkable versions, makes it easy to learn and use; but it has some minor flaws. Dec 93

★★★ **OrgChart Express 1.0, Kaetron Software, 713/298-1500, $199.** Organization-chart software links a database to standard box-drawing functions. Although the learning curve is steep, the effort may be worth it for people who regularly work with large or complex organization charts. Apr 93

★★★★ **Project Scheduler 5, Scitor Corp., 415/570-7700, $695.** For most midrange project-planning, this program's many hits outweigh its few misses. It goes beyond the requisite scheduling options, with inflation factors and unlimited projects in memory, and it conforms to accepted standards, so you get consistent, predictable results. Aug 93

★★ **Useful Voice Processor for Macintosh 1.1v7 (1.1v9), Useful Software Corp., 508/774-8233, $179.95.** Dictation software lets you record and transcribe on a Mac It has some useful features but you must take uncommon care to avoid crashes Dec 93

★★★ **Wingz 1.1ae, Informix Software, 913/599-7100, $399.** Low-overhead spreadsheet offers advanced-math functionality, a competent calculating engine and superior charts but is missing outlining real 3-D

continues

Star Ratings

spreadsheet linking, and the host of third-party add-ons offered for Microsoft Excel. Jul 93

★★★ **WordPerfect Works 1.2, WordPerfect Corp., 801/225-5000, $249.** This program offers seven well-integrated and flexible modules. It has a few shortcomings, including some memory-management problems, but buyers should generally be pleased. Jun 93

COMMUNICATIONS/NETWORKS

★★ **AccessPC 3.0, Insignia Solutions, 415/694-7600, $129.95.** Utility translates most word processor and some database formats, but it doesn't translate graphics, and some of its translations result in data loss. Apr 94

★★★ **Crosstalk for Macintosh 2.0, Digital Communications Associates, 404/442-4000, $195.** Commendable communications product has a feature set that well matches its competition. Still, the script editing is complex, and you must manually enter phone numbers each time you use it. Apr 94

★★★ **Delrina FaxPro for Macintosh 1.0, Delrina Corp., 408/363-2345, $129.** Fast, efficient fax software has an excellent address-book feature but also has some interface quirks and minor bugs. Feb 94

★★★★ **DOS Mounter Plus 4.0, Dayna Communications, 801/269-7200, $100.** File-transfer and translation utility works with floppies, removable drives, and network volumes and supports wild cards in DOS extensions. Apr 94

★★★★ **EtherPeek 2.0.3, LocalPeek 2.0.3, TokenPeek 1.0 (2.0.3), AG Group, 510/937-7900, $495 to $995.** Priced at a fraction of the cost of dedicated hardware analyzers, these network analyzer tools give you better analysis with a friendlier interface. They're a worthwhile investment. Jan 94

★★★★ **MacLinkPlus/Translators Pro 7.5, DataViz, 203/268-0030, $149.** If your PC files are in archaic formats, you'll need this file-transfer and translation utility. It's a great option for most users, but it doesn't support removable drives or network volumes. Apr 94

★★★★ **MicroPhone Pro, Software Ventures Corp., 510/644-3232, $295.** Truly comprehensive telecommunications package now includes send-and-receive fax software. Although the new TCP/IP tools are complicated, the documentation is clear and precise. Apr 93

★★★ **On The Air 1.0.1 (1.0.2), Digital Eclipse Software, 510/547-6101, $79.99 to $639.99.** Intercom system transmits System 7 SND resources, SoundEdit, and AIFF sound files across a network. It's well designed and performs decently, but its usefulness seems limited. Aug 93

★★★ **On The Road 1.1, Connectix, 415/571-5100, $99.** Helpful PowerBook utility looks at what's hooked up to your computer and adjusts accordingly—for example, printing when a printer is available and otherwise deferring printing. It only supports some hardware, however, so check before buying. Dec 93

★★★★ **Silver Cloud 1.2, AG Group, 510/937-7900, $495.** If you are administrating a large network and are drowning in a sea of devices and zones, this network-management software will make your life simpler. Feb 94

★★★ **SITcomm 1.0, Aladdin Systems, 408/761-6200, $120.** Inexpensive telecommunications software is fairly easy to set up and use, and will do well for people who use just one or two online services. Still, it lacks true scripting and has limited protocol options. Apr 94

★★ **SoftPC 3.1, Insignia Solutions, 415/694-7600, $499.** While the speed of this Windows PC emulator is greatly improved, buying an add-in PC card for your Mac is more efficient. Mar 94

★★★★ **Timbuktu 5.0.1, Farallon Computing, 510/814-5000, $199 to $5500.** By letting one computer (a Mac or a Windows-based PC) control, observe, or exchange data with another computer, this terminal-emulation product allows you to use resources almost anywhere on a network. Mar 93

★★★★ **VersaTerm 5.0, Synergy Software, 215/779-0522, $195.** The price and feature set of this network terminal-emulation package make it a terrific value, in spite of its complex documentation and limitations. If you're looking for a fast path to Internet connectivity, this is it. Jan 94

DESKTOP PUBLISHING

★ **AboutFace 1.1.1 (1.1.2), Big Rock Software, 716/288-2860, $69.95.** Type-specimen generator has many serious deficiencies that need to be addressed. Jan 94

★★★★ **Aldus Fetch 1.0, Aldus Corp., 206/622-5500, $295.** The rich feature set and network support of this image-cataloging software make it a clear winner. Although cataloging is slow, users have fine control of the depth and compression of thumbnails. Aug 93

★★★★ **Aldus PageMaker 5.0, Aldus Corp., 206/622-5500, $895.** Desktop publishing software has added the features, both great and small, that it's been lacking, while still retaining the ease-of-use advantages that it's always had. This is a superb upgrade. Nov 93

★★ **Aldus Personal Press 2.0, Aldus Corp., 206/628-2320, $199.** Basic, inexpensive page-layout program gains strength, but is still missing elements that novice users need, such as automatic kerning. Its software-knows-best approach to copyfitting makes manual fine-tuning difficult and is likely to confuse beginners. Mar 93

★★★ **Cumulus 1.1 (1.2), Canto Software, 415/431-6871, $295 to $895.** Good network support, plus a feature that creates a protocol file for recording user actions, make this image-cataloging program a good choice for workgroups. It doesn't have an image-preview feature, nor does it offer 32-bit thumbnails. Aug 93

★★★ **Expanded Book Toolkit 1.0.1 (2.1), The Voyager Company, 310/451-1383, $295.** Using this hypermedia publishing program, average mortals can create highly functional multimedia books in a fraction of the time it would take to do the job unassisted. Be aware, though, that it's no QuarkXPress. Jun 93

★★★★ **FontMonger 1.5.7, Ares Software Corp., 415/578-9090, $149.95.** Font-conversion utility provides cross-platform, cross-font conversion and makes it easy to create composite, subscript, superscript, and rotated characters. Sep 93

★★ **FotoTune 1.1, Agfa Division of Miles, 508/658-5600, $795.** Color-management software has a capable engine, but it's not the complete color-management system Agfa touts. Invisible tech-support and poor documentation were only part of the problem. Apr 94

★★★★ **FrameMaker 4.0, Frame Technology Corp., 408/433-3311, $895.** For such projects as long, structured documents—books, instruction manuals, and textbooks—this desktop publishing program is one of the best tools available. It's fast, well mannered, and a real time-saver. Mar 94

★★ **ImageAccess 1.0, Nikon, 516/547-4355, $495.** This expensive image-cataloging program has an unusual interface and cannot be used over a network. A plug-in module provides direct support for Nikon's LS-3510AF film scanner. Aug 93

★★★ **Kodak ColorSense 1.0, Eastman Kodak, 716/253-0740, $499.** Color-management system gives average users access to a reasonable level of color consistency at a reasonable price. It does not make color separations. Oct 93

★★ **Kudo Image Browser 1.0 (1.1), Imspace Systems Corp., 619/272-2600, $195.** This image-cataloging software cannot control thumbnail depth or compression and doesn't have a keyword feature or allow multiple users to access the catalog simultaneously. The unique Riffle feature lets you quickly scan images. Aug 93

★★★ **Lazy Dog Foundry Personal Font, Lazy Dog Foundry, 612/291-0306, $199.99 to $499.99.** Type 1 font made from your handwriting has clean, even lines—whether or not your writing does. Apr 93

★★★★ **Print Shop Deluxe, Broderbund Software, 415/382-4400, $50.** Even the most ham-fingered can create professional-looking greeting cards, signs, banners, letterhead stationery, and calendars with these desktop publishing templates and graphics. While it's not a substitute for a high-end program, it is easy to use and inexpensive. Apr 94

★★★ **Publish It Easy 3.0 (3.02), Timeworks, 708/559-1300, $199.95.** Desktop-publishing program offers writing, editing, formatting, page-layout, drawing, and painting tools with well-thought-out interface innovations, plus an excellent database manager. Unfortunately, the program is unstable and crash-prone. Mar 93

★★★★ **QuarkXPress 3.2, Quark, 303/894-8888, $895.** This upgrade adds the EfiColor XTension to ensure the greatest possible fidelity of color images and is a must-have for professional color publishers who use Quark. For others, the enhancements are welcome but minor enough that they provide little incentive to upgrade. Nov 93

★★★★ **SuperATM, Adobe Systems, 415/961-4400, $149.** This upgrade to Adobe Type Manager lets you view Adobe-brand PostScript fonts on screen and output them at high resolutions, even when the corresponding printer fonts are unavailable. Although it has limitations, this is an outstanding advance in font technology and a tremendous value. May 93

★★★★ **Tableworks Plus 1.05, Npath, 206/392-7745, $299.** Publishing utility adds a full table-editor to QuarkXPress and is a must-have for anyone doing even mildly complex tables. Jan 94

EDUCATION

★★★★ **Algebra 1.0, Broderbund Software, 415/382-4400, $69.95.** Interactive, imaginative math tutorial is keyed to the standard textbook order of topics, but offers much more. It is particularly strong on word problems and graphing. May 93

★★ **Comprehensive Review in Biology, Queue, 203/335-0908, $295.** There isn't a textbook publisher in North America with the nerve to publish a black-and-white biology book with nothing more than text and basic line drawings, much less charge several hundred dollars for it, but that, in effect, is what this CD-ROM is. May 93

★★★ **Compton's Multimedia Encyclopedia 1.00M, Compton's New Media, 619/929-2626, $795.** The down-to-earth writing style and numerous bells and whistles of this multimedia encyclopedia on CD-ROM appeal to younger readers, but the high cost and sluggish performance May be prohibitive. Apr 93

★★★★ **Decimal & Fraction Maze 1.2 (1.2.3), Great Wave Software, 408/438-1990, $69.95 to $89.95.** Education software weaves the threads of

eight math curricula—from third grade to eighth, along with two levels of adult education—into an interesting and visually stimulating game. Jul 93

★★ **Dvorak on Typing 1.0, MacPlay, 714/553-3530, $49.95.** Typing tutor offers solid lessons, but the small annoyances, such as never being able to take intermediate or advanced lessons without first passing a test, add up. Jun 93

★★★★ **How Computers Work, Time Warner Interactive Group, 818/955-9999, $79.99.** Graceful, well-integrated CD-ROM tutorial guides the curious through brief but helpful explanations of basic computer technologies. Jan 94

★★★ **HyperStudio, Roger Wagner Publishing, 619/442-0522, $179.95.** Hypermedia authoring tool supports color and many multimedia functions through easy-to-use dialog boxes, but the interface doesn't always follow Apple guidelines. Dec 93

★★★ **MacGrade 1.5.5, CalEd Software, 800/795-0641, $85 to $245.** Grade-book program has a straightforward, simple interface and clear documentation. Although there's room for improvement, it's easy to use and flexible. Feb 94

★★★★ **Mavis Beacon Teaches Typing 2.0, The Software Toolworks, 415/883-3000, $49.95.** If being entertained while learning to type interests you, this typing tutor provides varied environments, interesting lessons, and good games. Jun 93

★★★ **Millie's Math House 1.0 (1.1), Edmark Corp., 206/556-8400, $49.95.** Math-education software provides ways for preschoolers to experiment with numbers and counting. It's engaging, but more advanced levels would keep children challenged longer. Jul 93

★★★★ **The New Grolier Multimedia Encyclopedia, Grolier Electronic Publishing, 203/797-3530, $395.** The scholarly text of this encyclopedia on CD-ROM is suitable for sophisticated readers, while its speed, ease of use, and value are impressive. Apr 93

★★★★ **The Rosetta Stone, Fairfield Language Technologies, 703/432-6166, $395.** Foreign-language instruction on CD-ROM is a valuable educational tool and fun to use. The lessons are well paced, and the content is generally excellent and diverse. Jan 94

★★ **The Secret Codes of C.Y.P.H.E.R. 1.0 (1.1.1), Tanager Software Productions, 510/430-0900, $59.95.** Intriguing facts about mammals and a variety of alphabets provide the interest in this educational game, but the inescapable, repetitive animations are a major detraction. Apr 93

★★★ **The Secret Island of Dr. Quandary 1.0, MECC, 612/569-1500, $49.95 .** Clever package of gorgeous landscapes, catchy sounds, and tempting arcade-game puzzles uses math, logic, and reading skills. Although slow, it's fun for parents and kids. Jun 93

★★★ **Stickybear's Reading Room 2.2a, Optimum Resource, 803/785-7441, $59.95.** Educational game with four activities takes a sedate but direct path to building primary-level reading skills. Jun 93

ENTERTAINMENT

★★★★★ **Arthur's Teacher Trouble 1.0, Broderbund Software, 415/382-4400, $39.95.** Every page of this delightful animated book is dense with surprises that arouse and satisfy a child's curiosity. In the words of six-year-old Alex, "It's like chocolate ice cream. You can have it more than once and it's still good." Apr 93

★★★★ **A-Train, Maxis, 510/254-9700, $69.95.** Charming railroad simulation offers astonishing, and often witty detail, but the learning curve is high and the interface isn't completely Mac-like. Apr 93

★★★ **BlackJack Trainer, ConJelCo, 412/492-9210, $75.** Learn the strategies you need to win at blackjack with this program. There are a number of trivial bugs, but they won't get in the way. Oct 93

★★★ **Cogito 1.0 (1.04), Inline Software, 203/435-4995, $59.95.** Rubik's Cube fans will like this challenging game where the goal is to replicate a pattern by moving rows and columns of tiles. It gets more and more complex as you progress through the 120 levels. Apr 93

★★★ **Daily Sports Quiz 1.0, DreamTime, 619/236-1341, $49.95.** If you think you know a lot about sports and love to play trivia games, then this entertaining and informative game is for you. Oct 93

★★★★ **Falcon MC 1.0, Spectrum HoloByte, 510/522-1164, $69.95.** Whether you're an armchair jet jockey or an experienced fighter pilot, you're bound to be impressed by the 4-bit color, enhanced graphics, and sophistication of this latest incarnation of the original Macintosh combat flight simulator. Dec 93

★★★ **Hell Cab 1.0.1, Time Warner Interactive Group, 818/955-9999, $99.99.** Take a diabolical cabbie with a penchant for time travel, toss in the Empire State Building, add a few brainteasers, and you've got this engaging game on CD-ROM. It's slow and the arcade sections are hard to control, but overall it succeeds. Jan 94

★★★★ **Hellcats Over the Pacific 1.0.3, Graphic Simulations, 214/699-7400, $69.95.** Fly a WWII-era Navy fighter, the Grumman F6F Hellcat, against enemy planes in the South Pacific with this flight simulator that offers smooth graphics, good special effects, and great documentation. Apr 93

★★★ **Indiana Jones and the Fate of Atlantis, LucasArts Games, 415/721-3394, $59.95.** In this game, the whip-wielding archaeologist goes looking for Atlantis and finds it armed to the gills with magical technology and Nazi stooges. If you're not bothered by the story's astonishing sexism, you'll find it diverting. Oct 93

★★★★ **Jewelbox 1.5 (2.0), Varcon Systems, 619/563-6700, $49.95.** This gem of a game is strongly reminiscent of Tetris. The jewels fall into rows that disappear when you place three jewels of a kind together. Jun 93

★★★ **The Journeyman Project 1.0 (1.2), Presto Studios, 619/689-4895, $79.95.** Interactive science-fiction epic on CD-ROM is a work of art. The scenes are rich with painstakingly detailed graphics, elaborate models, and subtle textures, but the sluggish pace May leave you impatient and bored. Sep 93

★★★★ **Maelstrom 1.03, Ambrosia, P.O. Box 23140, Rochester, NY 14692-3140, $15 plus $5 shipping and handling.** Fast-paced arcade game is loosely modeled after Asteroids, the Atari classic. Maelstrom features superb animation, hilarious sound effects, exciting action—and best of all, it's shareware. Jun 93

★★★★ **Monkey Island 2: LeChuck's Revenge, LucasArts Games, 415/721-3394, $59.95.** This whimsical Twilight Zone of life on the sea is the adventure-game equivalent of *Mad* magazine, filled with splendid gross-out jokes, heapings of self-parody, and enough hilarious detail to keep you amused for days. May 93

★★★ **Mozart: The "Dissonant" Quartet, The Voyager Company, 310/451-1383, $59.95.** CD-ROM includes an unusual essay on stringed instruments, discussions of general musical concepts, an analytical overview of the quartet, and a taped minilecture on Mozart; but the music is limited almost entirely to the title piece. Apr 93

★★★★ **Myst 1.0, Broderbund Software, 415/382-4400, $59.95.** The smooth pacing of actions and sounds in this beautiful CD-ROM game give it a dreamlike quality. This is a game that's been polished until it shines. Mar 94

★★ **The Orchestra: The Instruments Revealed, Time Warner Interactive Group, 818/955-9999, $79.99.** The many-branched, interwoven, hypertext style of this music-education CD-ROM makes it hard to navigate and digest, despite its richness. For the price, other music-education CD-ROMs present better values. Apr 93

★★★★ **Richard Strauss: Three Tone Poems, The Voyager Company, 310/451-1383, $59.95.** *Don Juan, Till Eulenspiegel,* and *Death and Transfiguration* are included in this CD-ROM. The musical analysis is satisfying, and the lush orchestral music will appeal to both novice and experienced classical music listeners. Apr 93

★★★ **Schubert: "The Trout" Quintet, The Voyager Company, 310/451-1383, $59.95.** Alan Rich, classical music commentator for NPR, conveys his enthusiasm for this appealing music in this CD-ROM's lively text. The discussion is relatively unchallenging, and the musical performance is not at the top of most reviewers' lists. Apr 93

★★★★ **Seven Days in August, Time Warner Interactive Group, 818/955-9999, $59.99.** Compelling, interactive documentary on CD-ROM cuts a slice from history and offers August 10 through August 16, 1961, (the building of the Berlin Wall) to viewers in a way that truly evokes the period. Oct 93

★★★ **Sherlock Holmes, Consulting Detective, Volume II, Viacom New Media (formerly Icom Simulations), 708/520-4440, $69.95.** Match wits with the legendary detective by solving three difficult mysteries in this CD-ROM game. May 93

★★★ **Space Quest 1: Roger Wilco in the Sarien Encounter, Sierra Online, 209/683-8989, $19.95.** As Roger Wilco, starship janitor, you must defeat the evil Sariens in this adventure game where your head is more important than your hands. For most players the game will be easy to complete. Apr 93

★★★★ **Spectre Supreme, Velocity Development, 415/274-8840, $69.95 to $89.95.** The pleasure of this game comes not in high scores, but in the almost addictive sense of control you get from moving your tank around the screen. It's so much fun that it's even fun when you lose. Dec 93

★★★ **Super Mines 1.0, Callisto Corp., 508/655-0707, $49.95.** You use logic to search a minefield without setting off mines in this fast-paced game that's easy to learn, but offers 84 levels for long playability. Apr 93

★★★ **V for Victory: Utah Beach, Three-Sixty Pacific, 408/879-9144, ext. 23, $69.95.** The post-D-Day conquest of Normandy is re-created in this game; its strength is the way it blends easy play with complicated strategy. Some bugs exist. Oct 93

★★★★ **Who Killed Sam Rupert, Creative Multimedia Corp., 503/241-4351, $39.99.** You're a police detective trying to solve the murder of a popular restaurateur in this interactive CD-ROM that exploits the full range of multimedia options and provides a wealth of clues and surprises to hold your interest. May 93

FINANCE/ACCOUNTING

★★★★ **Andrew Tobias' TaxCut 1993, MECA Software, 203/255-1441, $79.95.** The free-form approach and flexible Help menus of this tax preparation software make filling out your tax return a smooth, almost relaxing process. The only state versions available are Cali-

continues

Star Ratings

fornia and New York. Apr 94

★★★★ **BestBooks 1.0, Teleware, 201/586-2200, $99.** In a straightforward, unintimidating manner, this small-business accounting program integrates the standard bookkeeping functions of accounts receivable, accounts payable, and general ledger. Jul 93

★★★ **ExpensePlus 1.0.1, State Of The Art, 714/753-1222, $139.95 to $159.95.** Software uses a Newton MessagePad to record expenses, then sends the data to a Mac to create and print expense reports. While it's a real time-saver, you need AppleScript expertise to modify the expense reports. Apr 94

★★★★ **MacInTax 1993, ChipSoft, 602/295-3110, $69.95.** Tax-preparation software provides a reasonably detailed manual and a reliable, structured interface for building your tax return. Its inability to accept figures containing amounts in cents or to round off to whole dollar amounts will frustrate some users. Apr 94

★★★ **MacInTax Tax Planner, ChipSoft, 602/295-3110, $19.95.** Software allows you to construct a five-year forecast of your tax liability, projecting tax figures through 1997 in a concise summary format. If you have a tax-preparation program, you can do the same thing by creating alternative tax returns. Apr 94

★★★ **MacInTax Tax Savings Guide, ChipSoft, 602/295-3110, $14.95.** Simple, straightforward collection of well-written, fully indexed tax tips and suggestions is designed to help you better understand your tax return and reduce your tax liability. Although strong in content, it doesn't allow you to copy and paste, export as a text file, or even print. Apr 94

★★★★ **Quicken 4, Intuit, 415/898-6095, $69.95.** Personal-finance software is powerful and easy to learn, even for a financial neophyte. Although slower than previous versions, 4.0 lives up to its promise of making financial chores easier and better organized. Nov 93

★★★ **WealthBuilder 2.0, Reality Technologies, 800/346-2024, $79.99.** Financial-planning software forces you to think about your money and helps you develop an investment plan. It's a good program for beginning investors, but more-sophisticated investors will want more-advanced features. May 93

GRAPHICS

★★★ **addDepth 1.0.2, Ray Dream, 415/960-0768, $179.** The purpose of this graphics program is to enhance the creation of 2-D images with 3-D effects. It's versatile, accommodating, and affordable, but working on complex images gets tedious because of the automatic application of styles. Aug 93

★★★ **Adobe Dimensions, Adobe Systems, 415/961-4400, $199.** This three-dimensional-effects utility May seem very limited, with white-only light and no surface texturing, but it's a ground-breaking product. It performs its 3-D illusions within the object-oriented, resolution-independent world of PostScript. Apr 93

★★★★ **Adobe Illustrator 5.0, Adobe Systems, 415/961-4400, $595.** The Mac's most dependable draw program has added enough new features to boggle the mind. It still can't import TIFF images, but it catches up with, and in some areas surpasses, the competition. Nov 93

★★★★ **Adobe Photoshop 2.5 (2.51), Adobe Systems, 415/961-4400, $895.** No graphics program is as universally loved as this one, but while this upgrade builds on the program's capabilities, it ignores some minor weaknesses that have begun to peek through the product's armor. It's still great but perhaps not perfect. Jun 93

★★★★ **Aldus FreeHand 4.0, Aldus Corp., 206/622-5500, $595.** The new page-design and text-editing functions of this powerful draw program make it more than worth the price of admission. Aside from some bewildering interface elements, it's an outstanding program. Mar 94

★★★★ **Alias Sketch 1.5, Alias Research, 416/362-9181, $995.** The enhanced modeling and revamped rendering capabilities of this 3-D illustration program contribute to a tremendous and reliable upgrade, a heartening example of a company listening to its users. Jul 93

★★ **ArtBeat Professional 1.0, Pie Practical Solutions, 201/902-9500, $249.** Despite a smattering of unique capabilities, this inexpensive draw/paint program lacks features of equivalent programs. Apr 93

★★★ **artWorks 1.0 (1.01), Deneba Software, 305/596-5644, $149.** If you're expecting a graphics dynamo, this combination paint and draw program will leave you a little cold. Despite its flaws, it ranks as one of the best graphics programs available under $200. Jun 93

★★★★ **Blueprint 4, Graphsoft, 410/290-5114, $295.** Entry-level 2-D drafting program is a wonderful antidote to the complicated CAD system blues. Don't be misled by the low price; this full-fledged drafting package is powerful enough to serve professionals who appreciate the value of simplicity. Jul 93

★★ **Brush Strokes 1.0, Claris Clear Choice, 408/727-8227, $139.** If you have absolutely no experience with computer graphics, the simplified interface of this 24-bit paint program might warrant its price. Otherwise, you can find better programs for less. Oct 93

★★★ **CA-Cricket Draw III 2.0 (2.01), Computer Associates International, 516/342-5224, $249.** This draw program is not going to inspire experienced Mac artists to jump up and down, but its features are abundant, the interface is straightforward, and the price is right. Oct 93

★★★ **Canvas 3.5, Deneba Software, 305/596-5644, $399.** Draw program offers two to three times as many features as any competing program, but our reviewer would prefer an interface that you can navigate without scrambling for the manual. Jan 94

★★★ **Color It 2.0.1, MicroFrontier, 800/388-8109, $299.95.** Overpriced color paint program has a full range of painting and image-retouching capabilities, including 15 levels of undo and an impressive magic-wand tool, but its naming conventions are bewildering. Apr 93

★★ **ColorUp 1.0, Pantone, 201/935-5500, $99.95.** Professional graphic designers don't need the advice of this color tutorial and series of palettes. Although nonprofessionals might benefit from the information on color theory, it may not be worth the money. Nov 93

★★ **CPM Graphic Tutor 1 & 2, Caseys' Page Mill, 303/220-1463, $489 per volume.** Although some neophytes may find these CD-ROM tutorials on Adobe Illustrator and Adobe Photoshop helpful, the programs' distracting interfaces, inconsistent execution, lack of polish, and high price weigh strongly against them. May 93

★★★★ **DeBabelizer 1.5 (1.5.5), Equilibrium Technologies, 415/332-4343, $299.** Bitmapped-graphics-conversion software supports a huge number of file formats and can work wonders. If you spend any significant time dealing with file conversion, you should have this program. Nov 93

★ **Easy Color Paint 3.0, MECC, 612/569-1500, $59.95.** For a program that purports simplicity, this color paint program is anything but. Possibly the weakest, least intuitive paint program for the Mac, it's unnecessarily complex and frustrating. Jul 93

★★★ **Expert Draw 1.0, Expert Software, 305/567-9990, $49.95.** Inexpensive draw program is not really for experts, but it offers a decent, no-frills set of basic drawing tools and commands for beginning illustrators, office use, or anyone on a budget. Aug 93

★★★★ **Folio 1 Media Kit-Print Pro, D'Pix, 614/299-7192, $499.95.** Each image in this texture collection on three CD-ROMs provides a dynamic range of colors, highlights, and shadows; is free of artifacts; and is crisply focused. Aug 93

★★★★ **Fractal Design Painter 2.0, Fractal Design Corp., 408/688-8800, $399.** If you can put up with a few inconveniences, this color paint software provides the tools required by professional artists, and many of its functions—natural-media brush tools, the color-sensitive magic wand—are entirely without peer. Jul 93

★★★ **Generic CADD 2.0, Autodesk, 206/487-2233, $495.** Competent, midlevel 2-D drafting program has a well-executed Mac interface, a good complement of tools, and a sprinkling of high-end features, such as floating-point precision. Aug 93

★★ **Image Assistant 1.0, Caere Corp., 408/395-7000, $195.** Besides unsatisfactorily addressing Adobe Photoshop's small list of liabilities, this image-editing software's problems include an unforgivable lack of antialiased text, no selective revert function, and an incorrectly implemented smudge tool. Apr 93

★★★ **Infini-D 2.5.1, Specular International, 413/253-3100, $995.** Serviceable 3-D graphics program has a wide range of modeling, rendering, and animation options, with a straightforward interface and quick operating speed. If it weren't for the bloated price, it would be the ideal entry-level program. Feb 94

★★★ **Ofoto 2.0 (2.02), Light Source Computer Images, 415/461-8000, $395.** Many new features—notably color support—have been added to the already impressive toolbox of this scanning software. It often produces good results, but it rarely produces the best scan possible for a given image and output method. Jul 93

★★★★ **Paint It 1.0, MicroFrontier, 800/388-8109, $59.95.** Straightforward color paint program lacks image-editing tools but has a versatile cast of selection and painting tools—and it's priced to sell. Apr 93

★★★★ **PosterWorks 3.0, S. H. Pierce & Co., 617/338-2222, $395.** This large-format graphics production tool is for people who think big, up to 10,000 square feet big. It fills the need for user-defined, full-color, large-format output robustly and elegantly. Aug 93

★★★★ **PowerDraw 4.0 (5.0), Engineered Software, 910/299-4843, $795.** The best new feature of this polished 2-D drafting program is an open architecture that supports modules that let you customize the program with application-specific tools, floating palettes, and menu commands. Sep 93

★★★★ **Showplace 2.0, Pixar, 510/236-4000, $495 to $695.** Adequate, entry-level 3-D modeler is suitable for illustration and other graphic arts applications. This version offers improved access to MacRenderMan, one of the best renderers around, plus plug-in modeling tools. Apr 94

★★★ **StrataVision 3d 2.6.3, Strata, 801/628-5218, $995.** 3-D program includes animation, and is a superior rendering tool and versatile modeler. It's a challenge to learn, however, as the interface is overly dense and sometimes sluggish. Feb 94

★★★★ **StudioPro 1.0, Strata, 801/628-5218, $1495.** If you need a well-balanced, all-in-one 3-D modeling, rendering, and animation solution, this application is an excellent choice. Mar 94

★★★ **Transverter Pro 1.0 (1.51), TechPool,**

216/291-1922, $395. Remarkable graphics-conversion software can read PostScript files and convert them to a variety of formats. As you might expect of a program attempting to fill such a tall order, its conversions are not always flawless, but it can be a lifesaver nonetheless. Nov 93

★★★ **Tree, Onyx Computing, 617/876-3876, $295.** Single-purpose program generates lifelike color drawings of trees from a number of easily controlled parameters. Although visually appealing, it's an expensive way to draw a tree. May 93

★★★ **upFront 2.0, Alias Research, 416/362-9181, $299.** Capable modeler is something of an acquired taste. However, take the time to learn it and you'll find useful, if unconventional and demanding, tools that are well suited for architectural modeling. Jan 94

★★★ **Virtus WalkThrough 1.1, Virtus Corp., 919/467-9700, $195.** Interactive 3-D modeling tool provides instantaneous access to rendered 3-D scenes, allowing you to travel through models at will. While it has some problems (such as occasionally just quitting), it's an excellent value. Jul 93

★★★ **Wraptures One, Wraptures Two, Form and Function, 619/536-9999, $95 each.** The images in these texture collections on CD-ROM are generally acceptable, although some are muddy and others are difficult to decipher at low resolutions. If you need images for repeating patterns, however, these repeat seamlessly and are a good value. Aug 93

MATH/SCIENCE

★★★ **Alchemy III, Tripos Associates, 314/647-1099, $950.** Molecular-modeling software can model decapeptides and DNA fragments, in addition to the expected small molecules, with refreshing alacrity on a Mac IIci or better. Sep 93

★★★ **Amazing Universe 2.1 (2.1a), Hopkins Technology, 612/931-9376, $79.95.** Space-image exploration package on CD-ROM offers an amazing variety of astronomical images with a very competent program (ProVision II) for modifying and inspecting those images. It assumes that users won't be fazed by such things as writing their own image-convolution matrices. Aug 93

★★★★ **Caduceus Science Review Macintosh Project 1.0, Scientia, 617/776-3427, $150 to $250.** If you're taking the MCAT, you'd be nuts not to buy this interactive science review. With proper use, its 9MB of files are certain to improve your score. Apr 94

★★★★ **CircuitMaker 3.0, MicroCode Engineering, 801/226-4470, $199.95.** Much of the tedium of diagramming circuits and constructing prototypes is relieved by this digital circuit simulator that provides a powerful set of basic tools for a very reasonable price. Aug 93

★★★★ **CSC ChemOffice 2.0, Cambridge Scientific Computing, 617/491-6862, $995 to $1595.** Comprehensive chemistry software is the Mac equivalent of software that seven years ago would have cost $200,000 and required an equally costly minicomputer. It's a winner. Feb 94

★★★★ **Data Desk 4.0 (4.1), Data Description, 607/257-1000, $595.** For finding patterns in data, this statistical-analysis program has no peer. Years of refinement have made it a uniquely valuable tool, despite its lack of some tests found in larger programs. May 93

★★★★ **Expressionist 3.0 (3.1), Prescience Corp., 415/543-2252, $159.** If you work regularly on similar topics, you can customize this equation-writing software to produce equations with exactly the appearance you want, letting you work at amazing speed. Mar 93

★★★ **f(z) 6, Lascaux Graphics, 602/299-0661, $115.** The main problem this math software attacks is four-dimensional visualization. It costs slightly more than a textbook, making it a great educational bargain. Sep 93

★★★ **FASTAT 2.0, SYSTAT, 708/864-5670, $495.** Statistical business-analysis software makes sense as a day-to-day statistics tool. It provides the right tests for most requirements, and its graph types provide plenty of information, although they lack glamour. Jun 93

★★★ **InStat 2.01, GraphPad Software, 619/457-3909, $95.** For scientists with limited statistics backgrounds, the chatty clarity of this lab-oriented statistics software's help screens will be invaluable, while the limited variables and minimal graphics won't be a problem. Nov 93

★★★★ **MacPhase 1.2, Otter Solutions, 315/768-3956, $159.** Low-cost, scientific-data-visualization software with a large assortment of mathematical tools is an authentic bargain. A principal strength is a well-planned color lookup table editor that's delightfully easy to use. May 93

★★★ **MathCAD 3.1, MathSoft, 617/577-1017, $495.** Numerical and symbolic computation software is easy to learn and use, and is much more powerful than earlier versions. It doesn't compete in scope with the largest math programs, but for most science and engineering tasks, it's a fast way to get problems solved. Jun 93

★★★★ **Mathematica 2.2, Wolfram Research, 217/398-0700, $595.** The one essential program in science and mathematics adds a function browser that makes the program as easy to use as it should be, as well as improvements to computational routines. Sep 93

★★★★ **MathType 3.0, Design Science, 310/433-0685, $199.** This equation-writing software makes automatic typographical decisions, which is helpful if you produce documents on a wide range of subjects. Its smooth integration with Microsoft Word is also convenient. Mar 93

★★★ **QC Tools 1.0, Abacus Concepts, 510/540-1949, $245.** Quality-control tool kit for StatView appears to introduce a slight slowdown in program response, but is generally well designed, well documented, and suitable for quality-control neophytes as well as professionals. Jan 94

★★★★ **Spyglass Dicer 2.0, Spyglass, 217/355-6000, $695.** Scientific 3-D visualization tool displays a two-dimensional slice through a three-dimensional object (which is represented in the computer by a data table). While Dicer pushes the limits of the Mac hardware, for its function this product is really the only game in town. Jul 93

★★★ **Spyglass Transform 3.0 (3.01), Spyglass, 217/355-6000, $595.** Scientific-visualization software can access data stored in every common format, offers some useful presentation-graphics features, and includes a programming language with a large range of built-in, high-level scientific functions. Sep 93

★★★★ **StatView 4.01 (4.02), Abacus Concepts, 510/540-1949, $595.** If your work uses statistics for decision support rather than abstract analysis, and you regularly have to present your results to nonstatisticians, this is the statistics package for you. Oct 93

★★★ **Sum Total 1.01, Concurrent Engineering Tools, 602/464-8208, $99.95.** Exceptional calculator utility is packed with advanced features, including a mode that lets you sample colors and use the numerical color values in calculations. The convenient palette approach causes a distinct time-lag in menu operations. Oct 93

★★★★ **Theorist 1.5, Prescience Corp., 415/543-2252, $289.95.** Symbolic-math program that you can figure out by yourself adds a useful table feature, more special functions of physics, and better graphics. It's still the only program to use real notation directly. May 93

★★★★ **Turing's World 3.0, CSLI Publications, 312/568-1550, $19.95.** Computer-science educational software lets you investigate some fundamentals in computing at an almost unbelievable bargain price. Feb 94

★★★★ **Visualization of Natural Phenomena, Telos/Springer Verlag, 408/249-9314, $59.95.** CD-ROM introduction to applying all aspects of computer graphics to scientific imaging covers all disciplines and offers definitive analysis of methods. No other source covers this much material, at this level of clarity. Jan 94

★★★★★ **Voyager II 1.0 (1.01), Carina Software, 510/352-7328, $159.95.** If a brilliantly lit, star-filled sky holds more than a moment's fascination for you, you need to know about this astronomy program. In a firmament of mostly faint and forgettable astronomy software, it's a supernova. Jul 93

ORGANIZATION/PRODUCTIVITY

★★★ **Achieving Your Career 1.02 (1.04), Up Software, 415/921-4691, $69.** HyperCard-based job-search software succeeds by compactly organizing. It provides a structure for identifying letters to write, phone calls to make, and interviews to follow up. Aug 93

★★★★ **CalendarMaker 4.0, CE Software, 515/224-1995, $59.95.** Polished, intuitive calendar-making program is straightforward, with a variety of options for customizing your calendar. Some features can be cumbersome. Oct 93

★★ **ClienTrac 1.7.1 (1.7.2), Whiskey Hill Software, 415/851-8702, $135.** Easy-to-use, HyperCard-based contact-management software performs as billed, but fails to inspire much enthusiasm. Aug 93

★★★ **Contact Ease 2.0.1 (2.0.2), WestWare, 619/274-5053, $395 to $1495.** Contact-management and sales-automation software helps salespeople keep in touch with contacts, makes it easy to generate letters, and maintains detailed records of activities. It has a few quirks but is overall a good program. Aug 93

★★★★ **DateBook and TouchBase Pro Bundle, Aldus Corp. Consumer Division, 619/558-6000, $149.95.** Calendar and contact manager offer a superior combination of integration, usefulness, and features. If you want to get organized, make sure you look at this dynamic duo. Feb 94

★★★★ **DayMaker 2.0 (2.03), Pastel Development Corp., 212/941-7500, $129.95.** If you need to organize lots of disparate information, follow up on meetings with many people, create an archive of completed work, and print out lists of to-do items, this free-form personal information manager is a great choice. May 93

★★★ **Dynodex 3.0 (3.0.1), Portfolio Software, 802/865-2700, $59.95.** The speed and printing options of this field-based address-book manager are its strengths, but this upgrade adds welcome improvements to the interface, including automatic formatting of phone numbers. Apr 93

★★★★ **In Control 2.0, Attain Corp., 617/776-1110, $89.95.** The best features of an outlining program are combined with those of a database, making it easy to sort, search, organize, and print your to-do list. Aug 93

★★★ **LapTrack For the Mac 1.0b (1.0g), Timeslips Corp., 508/768-6100, $79.95.** Time- and expense-tracking program offers the right features for the on-the-go professional, but the interface is overcomplicated and the documentation is sloppy. Still, in spite of its flaws, it does an excellent job. May 93

continues

Star Ratings

★★★ **Now Contact 1.0, Now Software, 503/274-2800, $99.** This contact manager has some innovative features and could easily become the top address-book program for the Mac by adding some features, such as file reconciliation. Mar 94

★★★★ **Now Up-to-Date 2.0, Now Software, 503/274-2800, $69.95 to $599.** Calendar utility combines flexibility, ease-of-use, and streamlined operations in an almost irresistible package. The Reminder control panel, while a great new feature, has had minor conflicts. Jun 93

★★★ **Power Team 1.0, ProVue Development Corp., 714/892-8199, $149.95.** Personal information manager consists of seven modules: Phone Book, Calendar, Correspondence, Checkbook, Calculator, Expense Report, and Mailing List. It has some bugs, but the data entry features are excellent. Oct 93

★★ **Rae Assist 1.0.2, Rae Technology, 408/725-2850, $199.** Although this personal-information manager offers some fresh ideas, including automatic linking of company and contact information, it's too big and too slow. Jan 94

★★ **TimeVision 1.0, Powercore, 815/468-3737, $99.** New scheduler with notepad and card-file functions tacked on has some worthwhile features, but in general doesn't match up to the competition. May 93

PRESENTATION TOOLS

★★★★ **Adobe Premiere 3.0, Adobe Systems, 415/961-4400, $695.** Solid and dependable QuickTime video-editing software offers a structured, responsive, and flexible interface with enhancements that range from the mundane to the dramatic. It can now mix 99 tracks. Jan 94

★★★★ **Astound 1.0, Gold Disk, 408/982-0200, $399.** Presentation software lets you include sound, text, and graphics animation with no more effort than pasting in a chart in other products. It's a good value. Nov 93

★★★★ **Authorware Professional 2.0.1, Macromedia, 415/252-2000, $4995.** Multimedia-scripting and -presentation software lets you develop complex presentations with amazing speed. Although expensive, it's wonderfully done and will pay for itself in time saved. Feb 94

★★★ **Avid Video5hop 2.0, Avid Technology, 508/640-6789, $499.** QuickTime video-editing program shines in its intuitive, easy-to-use interface, although it may fall short on features for serious video professionals. Feb 94

★★ **Comet CG 1.0.3 (2.2), M5I, 317/842-5097, $995.** Program for generating antialiased text over live video is reasonably priced compared with dedicated graphics systems, but you're likely to be as astonished by its limitations as you are impressed by its capabilities. May 93

★★★★ **Co5A After Effects 1.1, Co5A, 401/831-2672, $1295.** QuickTime movie editor blurs the boundaries between animation and traditional video-editing. It produces results that simply can't be created in other packages. Oct 93

★★ **Elastic Reality 1.0, A5DG, 608/273-6585, $349.** Exciting morphing tool can create professional-caliber results—if you can figure out how to use it. The needlessly convoluted interface, poor documentation, and inadequate tech support make that a difficult task. Feb 94

★★★ **Hi Rez Audio Volume 1.0, Presto 5tudios, 619/689-4895, $149.95.** The enjoyable, high-quality music on this CD-ROM adds a nice touch to presentations. The software for browsing the music is quirky, and the product could use some documentation. Jul 93

★★★ **Interactive Training for Director 1.1, Media In Motion, 415/621-0707, $199.** This somewhat expensive program teaches basic Macromedia Director skills and provides a foundation for exploring Director's other features. It has a clear, often lighthearted approach, but navigating the lessons can be frustrating. Jun 93

★★★ **Media-Pedia Video Clips, Media-Pedia, 617/235-5617, $195 to $495.** Fifty-seven minutes of stock footage for use in QuickTime movies includes over 150 different segments, ranging from unremarkable to dramatic to genuinely funny. Apr 93

★★★★ **Morph 2.0, Gryphon Software Corp., 619/454-6836, $239.** Easy-to-use morphing software is beautifully designed, with delightful new features such as the ability to morph QuickTime movies. Using it is as painless as morphing gets. Apr 94

★★ **MovieWorks 1.1, Interactive 5olutions, 415/377-0136, $395.** Over 100 bugs were fixed in version 1.1 of this multimedia authoring software that takes an all-in-one approach to creating presentations, but problems remain. It's a good idea, poorly executed. Jun 93

★★★ **Passport Producer Pro 1.0, Passport Designs, 415/726-0280, $995.** Superb, albeit quite expensive, media-integration package makes assembling even complex presentations surprisingly easy. Path animation is limited to entrances and exits. Apr 94

★★★ **QuickFlix 1.0, VideoFusion, 419/891-1090, $149.** Approachable QuickTime moviemaking software lacks the high-end features of other programs but costs a whole lot less. Feb 94

★★★ **VideoFusion 1.0.1 (1.5), VideoFusion, 419/891-1090, $649.** Collection of special effects for QuickTime movies may not be for the casual user, but if you have the equipment and you can't live without spinning logos, then go ahead and indulge. Jul 93

★★★★ **Working Model 1.0, Knowledge Revolution, 415/553-8153, $995.** Animators and engineers will love this terrific motion simulator that mimics real motion by applying physical laws to objects. It's easy to learn and use, but you'll need some understanding of math and physics. Oct 93

PROGRAMMING

★★★ **CLImate 1.0, Orchard 5oftware, 617/876-4608, $59.95.** With a little more documentation and a few more sample programs, this utility that provides a subset of Unix-like commands for the Mac environment could be an irresistable package. Oct 93

★★★ **EI5ToolKit 2.0 (2.11), Micro5trategy, 302/427-8800, $1995.** Reliable, field-tested developer's environment for creating executive information systems provides automatic access to information in spreadsheets and databases across a distributed system. May 93

★★★★ **FutureBA5IC 1.0 (1.02), Zedcor, 602/881-8101, $299.95.** Complete, easy-to-learn, real-world programming tool has full Toolbox, System 7, and assembler support. It's a wonderful tool that's rapidly becoming a favorite among commercial developers. Jul 93

★★★ **Macintosh Common Lisp 2.0 (2.0.1), APDA, 716/871-6555, $495.** Anyone who likes programming in LISP will be pleased with the environment provided by this version of the standard dialect and its extensive debugging and interface-building facilities. Oct 93

★★★ **Object Logo 5tudent Edition, Paradigm 5oftware, 617/576-7675, $49.95.** This book-plus-disk package offers a wide-ranging introduction to programming concepts. It's aimed roughly at the high-school educational level and lets you see something happen for every few lines of code you type. Jul 93

★★★★ **Object Master for Think C and C++, ACI U5, 408/252-4444, $255.** Object-oriented development environment is full of goodies and will pay for itself in about a week, due to increased programmer productivity. Apr 94

★★★★ **PG:Pro 1.5 (2.1), Staz Software, 601/255-7085, $169.** For part-time or novice programmers, the combination of these BASIC programming tools and FutureBASIC is a fast path to a working program. Jul 93

★★★ **PowerPacks 2.0, NDG Phoenix, 301/718-8880, $225.** Programmers' tool kit for 4th Dimension provides 280 external procedures to improve custom applications and exploit System 7 features. Don't expect any quick fixes for 4D's less-than-blistering performance in most areas, though. Oct 93

★★★★ **5malltalk/V for Macintosh 2.0, Digitalk, 714/513-3000, $495.** Object-oriented development system is now even more viable for commercial projects, while Digitalk's customer support and documentation set a standard other vendors should emulate. Feb 94

★★★ **5oftPolish 1.1, Language 5ystems Corp., 703/478-0181, $295.** Program-quality-assurance utility systematically checks the resources in a program's interface against a huge laundry list of errors. It's a programming tool for anyone who hopes to produce a commercial Mac application. Sep 93

★★★ **5ource5afe 2.1, One Tree 5oftware, 919/821-2300, $295 to $1195.** Solid, relatively easy-to-use product handles program-development administrative tasks, including version control, for multiplatform programs being created by groups. Sep 93

★★★★ **5ymantec C++ for Macintosh 6.0, Symantec Corp., 408/253-9600, $499.** If you like Think C, you'll like this software-development system, too. For the Mac, it's an excellent opportunity to catch a new wave in programming. Nov 93

UTILITIES

★★★ **7th Heaven 2.5 (2.5.1), Logical 5olutions, 612/659-2495, $99.95.** Our reviewer found the seven enhancements to System 7 fun and elegantly done, but not all of them were useful. Jul 93

★★★ **Alki 5eek 2.1, Alki 5oftware Corp., 206/286-2600, $39.95.** Competent file-finding utility scans by file name or content and lets you combine multiple search criteria. It cannot search in the background or find text in compressed files. Jul 93

★★★ **Billy Steinberg's PBTools 1.0.1, Inline 5oftware, 203/435-4995, $99.55.** If you want basic PowerBook management without added frills or complex menu bar displays, this collection of four utilities may be just your cup of tea. Jul 93

★★★ **Chameleon 2.0.3 (2.1), Logical 5olutions, 612/659-2495, $59.95.** Sleek desktop-pattern editor comes with an ample supply of rich, textured color images and a set of limited but functional editing tools. Sep 93

★★★★ **ClickChange 2.0, Dubl-Click 5oftware, 818/888-2068, $89.95.** Interface-customizing package has nothing you need but is filled with everything you want, including tools that let you alter major elements of the Mac's look and feel. Aug 93

★★★ **Connectix Desktop Utilities 1.0 (1.0.1), Connectix Corp., 415/571-5100, $99.** Although some of the 16 utilities offered in this package are more at home on a PowerBook, this collection offers one-stop shopping at a low price. It's worth it for the file-synchronization, Keyboard Power, and Hot Keys features alone Nov 93

★★★★ **CopyDoubler 2.0 (2.0.1), Symantec/Fifth Generation Systems, 504/291-7221, $59.** This utility speeds up copying, lets you queue jobs for background copying, and offers a variety of other useful, copying-oriented features—all at a very reasonable price. Nov 93

★★★ **Copyright Pro 1.0.3, CSG Technologies, 412/471-7170, $79.** Utility takes over the Finder's copying function, copies in the background, and allows you to regularly schedule copying. It doesn't speed up copying, however. Nov 93

★★★★ **CPU 2.0 (2.0.1), Connectix Corp., 415/571-5100, $99.** Reasonably priced collection of utilities for the PowerBook adds new features, including file synchronization, that easily justify the upgrade price. Sep 93

★★★ **CryptoMactic 1.0.1, Kent Marsh, 713/522-5625, $99.** Security software offers fast Finder-level encryption and decryption with effective file removal. Although its simplest encryption algorithm isn't quite hacker-proof, it's worth considering. Feb 94

★★★ **DiskFit Direct 1.0, Dantz Development Corp., 510/253-3000, $49.95.** Basic but efficient backup system is simple and painless enough to foster better backup habits in anyone who uses it. It doesn't back up to hard drives or tape drives. May 93

★★★★ **DiskLock PB 1.0, Symantec/Fifth Generation Systems, 504/291-7221, $59.** PowerBook security software balances robust security with simplicity and ease of use. It's much harder to crack than most PowerBook utility collections' security features, and will keep out all but the most determined. Jan 94

★★★ **The Disney Collection Screen Saver, Berkeley Systems, 510/540-5535, $49.95.** Mickey, Goofy, Peter Pan, Ariel, and other Disney favorites cavort around your screen with this screen saver that includes 16 different modules. Mar 94

★★★ **DriveShare 1.03, Casa Blanca Works, 415/461-2227, $129.95.** This utility allows users to share a removable drive over a network. It's most useful if your network consists of both System 6 and System 7 users, as its advantages over System 7 file sharing are slight. Nov 93

★ **DriveTech 1.0, MicroMat Computer Systems, 415/898-6227, $59.95.** Without decent documentation or clearer error messages, this floppy-drive cleaning and diagnostic program is essentially a $60 floppy-drive cleaning kit. Since you can buy a cleaning kit without software for $10, that makes it a bad deal. Jan 94

★★★ **DupLocator 1.03, Midnight Software, 303/933-1013, $99.** For new Macintosh users who don't have a general file utility, this software that locates duplicate files, as well as performs basic file commands such as moving and renaming files, may be useful. Jan 94

★★ **DynoPage 2.0, Portfolio Software, 802/865-2700, $59.95.** While this utility simplifies the printing of booklets and double-sided pages, it doesn't support PostScript graphics, is incompatible with some popular applications, and has a buggy drag-and-drop feature. Jul 93

★ **eDisk 1.0 (1.2), Alysis Software Corp., 415/566-2263, $149.95.** Driver-level compression software has little to recommend it over file-level, idle-time compression programs. The biggest drawback is the strong potential for disk or file corruption. Oct 93

★★★ **Freedom of Press Classic, ColorAge, 508/667-8585, $149.** Utility allows you to print PostScript graphics on almost any non-PostScript printer—easily and with impressive results. Mar 94

★★★ **Icon 7, Inline Software, 203/435-4995, $79.95.** Simple, straightforward utility has a streamlined and intuitive library feature for storing and retrieving icons, plus tools for icon editing. Its icon collection, however, is pretty paltry. Sep 93

★★★ **Icon-It Pro 3.0.6, Olduvai Corp., 305/670-1112, $129.** Utility allows you to attach custom tool bars to almost any application, including the Finder. The interface is quirky, but you get used to it. Dec 93

★★★ **I Like Icon 1.0, Baseline Publishing, 901/682-9676, $59.95.** Glitzy utility has tools for icon editing, has a nice library of icons, and can create animated icons. Some basic features, such as a text tool, are missing, and the animated icons are fun but impractical. Sep 93

★★★★ **KidDesk 1.0 (1.1), Edmark Corp., 206/556-8484, $39.95.** If you have young children who love to experiment with your Mac, this desktop environment provides easily navigable play while protecting your files from the havoc that little fingers can wreak. Jun 93

★★★ **MacPak 1.0, Symantec/Fifth Generation Systems, 504/291-7221, $149.** The quality of this utility collection is uneven—some modules are unpolished—but if you don't already own AutoDoubler, CopyDoubler, and a good file-management program, it's worth the price. Jan 94

★★★★ **MacTools 3.0, Central Point Software, 503/690-8090, $149.** Recovering trashed files is a snap with this utility package that fixes more disk problems than its competition. It includes disk-and-file maintenance, disk repair, virus protection, and backup. Mar 94

★★ **Magic Typist 2.0, Olduvai Corp., 305/670-1112, $129.** If you want to speed up typing of repetitive phrases or if you don't have full use of your hands, this utility, which automates typing of repetitive phrases, may be useful, but some functions work erratically or not at all in Microsoft Word. Sep 93

★★★★ **Mr. File 2.0, Softways, 408/978-9167, $99.** The well-designed background capabilities of this Finder utility make it a handy tool for copying, finding, moving, launching, and renaming files, although it has a few interface quirks. Dec 93

★★★ **Norton Essentials for PowerBook 1.0, Symantec Corp., 310/453-4600, $129.** Uneven collection of PowerBook utilities ranges from the useful Instant Access module, which automatically turns AppleTalk on and off, to the relatively inaccurate Battery Gauge feature, which tries to tell you your battery's status. Apr 93

★★★ **Now Compress 1.0 (1.0.1), Now Software, 503/274-2800, $99.** Compression utility holds its own in a crowded market; it's easy to use, it's complete, and it compresses as well as or better than other options. Dec 93

★★★ **Now Fun, Now Software, 503/274-2800, $69.** Five control panels let you liven up your Mac by customizing everything from menu colors to system sounds. The included screen-saver modules and desktop patterns and pictures are fairly limited, though. Dec 93

★★★★ **Now Utilities 4.0.1 (4.0.1p), Now Software, 503/274-2800, $129.** Many thoughtful improvements have been added to this collection of utilities, which is now better integrated, more logically designed, and still an excellent deal for your dollar. The new scrapbook feature, however, is awkward and inconvenient. Aug 93

★★★ **OptiMem 1.4.1, Jump Development Group, 412/681-2692, $129.** Systemwide memory manager monitors RAM use and allocates RAM where it's needed. Works best with software that handles minimum-memory situations effectively. Mar 94

★★★ **Peace of Mind 1.2.2, Polybus Systems Corp., 716/871-6533, $149.** Hardware diagnostic tool performs exhaustive tests on major Mac hardware components, does an excellent job of diagnosing simple simulated hardware errors. The program has minor bugs and lacks a comparative test-history feature. Jun 93

★★★★ **PicturePress 2.5, Storm Technology, 415/691-6600, $99.** This image-compression software supports every useful storage mode, has new calculation features for improved image fidelity, and is twice as fast as version 2.0. Mar 93

★★★ **PowerMerge 1.0.2 (1.0.3), Leader Technologies, 714/757-1787, $129.** File-synchronization utility has a potentially confusing interface, but is a handy means of updating selected files so that different Macs end up with identical versions of the selected documents. Apr 93

★★★ **Power To Go 2.0, Claris Corp., 408/727-8227, $99.** PowerBook utility collection has a few unique slants—including a floating palette that can display battery-life estimates—that keep it above the also-rans. It does lack features of similar products. Dec 93

★★★ **Public Utilities for the Macintosh 1.0, Symantec/Fifth Generation Systems, 504/291-7221, $149.** Utility program sticks to the basics of disk diagnosis, disk repair, and file optimization. It does a good, and in some cases unique, job, although disk optimization is slow. Jun 93

★★★★ **QuicKeys 3.0, CE Software, 515/221-1801, $169.** The simple, unintimidating interface of this macro-building utility allows you to build a set of useful shortcuts quickly. Mar 94

★★★ **RapidTrak 1.0.1 (2.0), Insignia Solutions, 415/694-7600, $99.95.** If you've got RAM to spare, this hard drive formatter offers driver-level RAM caching to store frequently used data and improve performance, especially on slower-speed drives. May 93

★★★ **Redux Deluxe 2.0.2, Inline Software, 203/435-4995, $79.95.** Easy to learn and relatively simple to use, this backup program has some powerful features, such as scripting, but it doesn't have a compression option. Jan 94

★★★★ **Retrospect 2.0, Dantz Development Corp., 510/253-3000, $249.** Powerful backup and archiving software has an improved interface and scripting capabilities, and works well for all levels of users. Sep 93

★★★★ **Retrospect Remote 2.0, Dantz Development Corp., 510/253-3000, $449.** Utility allows fast, automatic backup of networked Macs to a central Mac with a backup device. It worked flawlessly in our reviewer's tests. Sep 93

★★★ **Safe and Sound, Central Point Software, 503/690-8090, $49.95.** Limited but useful disk-protection and -salvage utility has a clean, simple interface and is an efficient emergency recovery tool. Jun 93

★★ **SafeDeposit 1.2, Dayna Communications, 801/269-7200, $189.** Automated backup program is easy to set up but slow. Also, unattended backups must be restarted from scratch if disk space runs short and a new disk isn't inserted. Sep 93

★★ **Safe or Sorry 1.0, Olduvai Corp., 305/670-1112, $59.** Unobtrusive control panel periodically saves all of your keystrokes, but requires System 7.1 and offers no clear-cut advantages when compared with other text-recovery programs. Oct 93

★★★★ **SAM 3.5.8, Symantec Corp., 408/253-9600, $99.** Efficient, thorough virus-protection software slows down system start-up and application launching, but this program is a worthwhile investment for anyone who exchanges or downloads files. Mar 94

★★★★ **Screenscapes 1.0.1, Kiwi Software, 805/685-4031, $44.95.** With more than 600 desktop patterns—and a suite of well-designed modules to trans-

continues

Star Ratings

form those patterns—this fun and frivolous utility lifts desktop-pattern design to new heights of elegance. Nov 93

★★★ **Square One 1.5.2, Binary Software, 310/582-8293, $74.** Flexible, attractive icon-based file launcher provides infinitely customizable palettes, including one that displays active applications. The application will consume 400K of your system memory. Aug 93

★★ **Stacker for the Macintosh 1.0.1, Stac, the Data Compression Company, 619/431-7474, $149.** As long as you pay attention to the capacity of your hard drive, this driver-level compression product performs reasonably well, except for its slow hard drive read quotient. Oct 93

★★★★ **Star Trek: The Screen Saver, Berkeley Systems, 510/540-5535, $49.95.** Go where no Mac has gone before with this screen saver based on the original "Star Trek." May 93

★★★★ **Star Wars Visual Clips, Sound Source Unlimited, 805/494-9996, $89.95.** Control panel lets you play QuickTime movie clips from *Star Wars* at system events. If you have the money, the hard drive space, and the RAM, this is the kind of totally cool toy that will make you remember why you love your Mac. Sep 93

★★★ **Super 7 Utilities, Atticus Software, 203/324-1142, $99.95.** Collection of seven control panels/extensions adds some ease of use to System 7, although none of its functions are essential. Modules perform tricks such as turning any menu into a tear-off palette, and randomizing the sounds that play in response to errors. Apr 93

★★★ **Tempo II Plus 3.0.9, Affinity Microsystems, 303/442-4840, $179.95.** Very capable macro-creating utility may be daunting for novices but offers plenty of power for advanced users. Mar 94

★★★★ **TimesTwo 2.0, Golden Triangle Computers, 619/587-0110, $149.** This driver-level compression utility is transparent and robust. It caused no problems through a two-month course of testing, on a system with myriad utilities and system software tools. Mar 94

★★★★ **Toner Tuner 1.0.3, Working Software, 408/423-5696, $24.95.** Inexpensive, incredibly useful extension adds a sliding bar to print dialog boxes allowing you to adjust the amount of toner applied to each print job. If you can't save trees, you can at least save toner. Dec 93

★★★★ **ultraShield 1.252 (1.3), usrEZ Software, 714/756-5140, $149.** Sophisticated security product combines practically every feature you might need into an integrated package, including a lightning-fast version of the U.S. government data-encryption standard. Dec 93

★★★ **Virtual 3.0.1, Connectix Corp., 415/571-5100, $99.** If you need to eke out as much virtual memory speed as possible, this utility may be a useful tool. For System 6 users who want virtual memory, it's the only game in town. Sep 93

★★★ **Working Watermarker 1.02, Working Software, 408/423-5696, $49.95.** Simple, useful system extension allows you to print or fax text and/or graphics "watermarks" in the background of virtually any document. Although it has imperfections, it's earned a permanent spot in our reviewer's System Folder. Jan 94

VERTICAL MARKETS

★★★ **Compare-A-Loan 4.0.2 (4.1), Softflair, 612/894-3357, $79.95.** Although geared to professionals, this product for home-loan evaluation provides thorough documentation and is structured so that anyone can use it. Apr 93

★★★ **Expert Home Design 1.0 (1.0.3), Expert Software, 305/567-9990, $49.95.** Quickly and easily create home- or office-interior layouts that are precise, but not as detailed as blueprints, with this interior design software. May 93

★★★★ **Finale 3.0.1, Coda Music Technology, 800/843-2066, $749.** Upgraded music-notation software is now infinitely more pleasant to use. Its comprehensive feature set makes it the standard against which all other music-notation products must be judged. Dec 93

★★★ **LoanLease Library 3.0.3 (3.05), Softflair, 612/894-3357, $99.95.** If you are generating a loan or a lease and need to keep track of payments, this well-documented program for loan evaluation is a worthwhile investment, despite its minor eccentricities. Apr 93

★★ **MacInteriors, Microspot, 408/253-2000, $129.** Correctly placing objects is unduly cumbersome in this interior-design software, but once you catch on to the program's quirks, it's useful. Feb 94

★★★★ **Musicshop 1.0, Opcode Systems, 415/856-3333, $149.95.** MIDI sequencer is an excellent choice as a first sequencer. It's powerful enough to satisfy the needs of most MIDI users. Oct 93

★★★ **Roll Call 2.0 (2.5.6 or 3.0), By the Numbers, 603/927-4508, $495 to $595.** 4th Dimension database application for church management helps track donations, attendance, church-group membership, and visitation. While not a complete church-management system, it's an acceptable complement to a general accounting program. Aug 93

★★★ **Sailing Master 1.1, Starboard Software, 313/662-4393, $64.99.** Though the slow speed and jerky motion point to less-than-polished programming, this sailboat-racing simulation offers good tactical play and is fun—well worth the price for sailing competitors. Nov 93

WRITING TOOLS

★★★★ **Final Draft 2.0.3 (2.0.4), MacToolkit, 310/395-4242, $349.** Script writing gets simpler with this well-conceived software that automates formatting of different elements in a script. Customization is easy, and macros automate typing of common phrases. Apr 93

★★★ **Just Joking 1.0, WordStar International, 415/382-8000, $49.** HyperCard stack of around 2800 humorous quotations offers a serviceable selection of sayings from a diverse group of humorists, comedians, philosophers, and writers, among others. Apr 93

★★ **MasterWord 5.1, Alki Software Corp., 206/286-2600, $99.95.** The centerpiece of this package of add-on Microsoft Word commands is a set of customizable tool bars. Unfortunately, rough edges remain, including inaccuracies in the documentation and some features that don't work as advertised. Aug 93

★★★★ **Microsoft Word 5.1 (5.1a), Microsoft, 206/882-8080, $495.** Small, solid upgrade fine-tunes some plug-in modules and adds new modules including an icon tool bar and text annotation. It's worth the upgrade price, but it won't give Word 5.0 users goosebumps. Mar 93

★ **The Oxford English Dictionary, Oxford University Press, Electronic Publishing, 212/679-7300, ext. 7370, $895.** CD-ROM dictionary contains 20 print volumes including half a million words, but the flaws, omissions, unreliability, and unforgivably poor design are unbearable. Apr 94

★★★ **RightWriter for the Mac 5.0, Que Software, 317/573-2500, $99.95.** Grammar checker looks at writing style, word usage, punctuation, and capitalization, as well as grammar. Customizable filters and multiple approaches to analysis are nice, but—as with all grammar checkers—not all the advice is great. May 93

★★★ **ShowScape 4.1, Lake Compuframes, 914/941-1998, $429 to $679.** This script-writing software formats scripts in either screenplay format or dual-column format (for audio and video) and allows you to choose the number of shots displayed per page, but it requires you to own and work in WordPerfect. Apr 93

★★★ **Spelling Coach Professional 4.0.1, Deneba Software, 305/596-5644, $195.** If you're considering investing in reference software, this spelling checker, dictionary, and thesaurus is a relatively capable, if expensive, alternative. Oct 93

★★★★ **Thunder 7 1.5.3, Baseline Publishing, 901/682-9676, $99.95.** Stand-alone spelling checker and thesaurus interactively monitors your keystrokes and alerts you to potential errors as they are entered. It quickly and transparently prevents you from making embarrassing typos. Nov 93

★★★ **VersionMaster 1.5, AStar Technologies, 508/486-8532, $199.95 to $1199.95.** Document-management utility helps you archive and track versions of a file by maintaining a database of altered documents. It's recommended only for workgroups that routinely follow check-out procedures. Apr 93

★★★★ **WordPerfect for Macintosh 3.0, WordPerfect Corp., 801/225-5000, $495.** The innovative interface of this word processor uses context-sensitive button bars and expandable rulers to make innumerable features accessible with a click of the mouse. It's an accomplishment in ease of use. Mar 94

★★★ **A Zillion Kajillion Rhymes 1.0, Eccentric Software, 206/628-2687, $49.95.** Rhyming dictionary is quick, small, simple, and self-contained; but it only rhymes with the roots of search words (and ignores *-ed, -s,* and *-ing* endings). Nov 93

Hardware

MISCELLANEOUS HARDWARE

★★ **ACS100, Altec Lansing Consumer Products, 717/296-2818, $180.** Lightweight powered speakers don't sound as good as they should. There's too much emphasis on the high end at the expense of the midrange, and they hiss noticeably. Dec 93

★★ **ACS150, Altec Lansing Consumer Products, 717/296-2818, $150.** Subwoofer rounds out the sharp tones of the ACS100, but the bass response is neither punchy enough nor loud enough, and the unit is about the size and weight of a concrete block. Dec 93

★★ **Address Express, CoStar Corp., 203/661-9700, $499.** Flaky performance and system crashes plagued this envelope-and-label printer in our tests, but the print quality was good. Oct 93

★★ **Apple Adjustable Keyboard, Apple Computer, 408/996-1010, $219.** Keyboard is only a slight improvement on the flat slab keyboard. Theoretically, it corrects ulnar deviation, but many sufferers of repetitive stress injuries want a keyboard that adjusts vertically. Jul 93

★★★★ **AppleCD 300, Apple Computer, 408/996-1010, $599.** Double-speed CD-ROM drive spins its discs at twice the speed of earlier drives, providing faster access to large files. Jun 93

★★★★ **Apple Color OneScanner, Apple Computer, 408/996-1010, $1349.** Tests of this color scanner demonstrate unpolluted colors and sharp image details, perhaps due to color filters and lenses that Apple claims were designed and tuned for the scanner Jul 93

★★★ **AppleDesign Powered Speakers, Apple Computer, 408/996-1010, $179.** Tall and curvy powered speaker set looks and sounds good and can produce uncomfortably high volumes without noticeable distortion, but the bare-wire-and-terminal connections aren't user-friendly. Dec 93

★★★ **Apple Newton MessagePad, Apple Computer, 408/996-1010, $699.** Although Apple released this personal digital assistant too early and marketing hype led to mistaken expectations, this is a very intelligent piece of work with an impressive variety of serious business uses. Dec 93

★★★ **Apple PowerCD, Apple Computer, 408/996-1010, $400.** This extremely versatile and beautifully designed portable CD-ROM drive offers impressive audio and Photo CD features, but if you're a serious CD-ROM user, it's too slow to satisfy. Jan 94

★★★★ **ArtZ ADB Tablet, Wacom Technology Corp., 206/750-8882, $449.** Combining pressure-sensitive operation, manageable size, and a new pencil-thin stylus, this affordable digitizing tablet is perfect for artists looking for traditional-style control of their graphics programs. Aug 93

★★★ **Computer Crayon, Appoint, 510/463-3003, $49.** The kid contingent's verdict was a definite thumbs-up on this brightly colored input device that's shaped like a thick pencil. The buttons can be hard for smaller children to press, and serious computer artists should still opt for a drawing tablet. Oct 93

★★★★ **Coolscan LS-10e, Nikon Electronic Imaging, 516/547-4200, $2600.** Compact desktop scanner for digitizing images from 35mm transparencies is slow, but delivers images good enough for newsprint publications and some catalogs. Dec 93

★★★ **EMBARC, Embarc Communications Services, 407/364-2000, $395 plus fees.** If you're a PowerBook user who is frequently in places with no telephone and you need timely delivery of electronic news and E-mail, this portable wireless message service may prove useful, but the cost may be prohibitive to others. Sep 93

★★★★ **Epson ES-800C, Epson America, 310/782-0770, $1499; Macintosh interface kit $399.** Flexible 400-dpi scanner offers a range of options, including one- or three-pass scanning, plus a full-featured, easy-to-use software package. Aug 93

★★ **Gulliver, Appoint, 510/463-3003, $119.** This diminutive mouse is hard to hold comfortably for an extended period, but it works well on almost any surface and is an acceptable option for PowerBook users. Oct 93

★★ **G-Vox, Lyrrus, 215/922-0880, $399.** Hardware-software guitar-instruction package lets your Mac "hear" the notes you play on your guitar. Although the hardware works well, the software has some basic problems and doesn't live up to the hardware. Apr 94

★★★ **Hello Music, Yamaha Corp. of America, 714/522-9240, $449.** MIDI starter kit includes an impressive tone generator that's compatible with General MIDI Level 1 and Roland MT-32, but the included software is functional at best. Dec 93

★★★ **Lightning5can Portable, Thunderware, 510/254-6581, $459.** PowerBook owners will find this hand scanner's modem- or serial-port connection, lightweight interface, and total portability well worth the cost, although the scanner is incompatible with some desktop Macs. Dec 93

★★ **Macintosh TV, Apple Computer, 408/996-1010, $2079.** As a computer, this combination computer-television–CD player is sleek but slow. You can get faster performance and better expandability from several less-expensive Performa models. Apr 94

★★★★ **Mirror 800 Plus Color 5canner, Mirror Technologies, 612/633-4450, $1299.** Add the NuBus JPEG board ($300) and easy-to-use 35mm transparency scanning module ($599) to get a nifty—if slow—desktop scanning package for a reasonable price. Jan 94

★★★ **PenDirect ADB, FTG Data 5ystems, 714/995-3900, $498.** Input device lets you manipulate items on the Macintosh screen using a special stylus called a light pen. It works well, although it seems ergonomically inferior to a mouse for routine tasks. Mar 94

★★★ **PowerLink Presentor, E-Machines, 503/646-6699, $499.** Simple, compact Duo dock wobbles a bit when plugged in but provides fine support for a variety of displays, plus ports for ADB, floppy drive, and sound output. Nov 93

★★★ **PowerPlate, Technöggin, 513/321-1777, $169.95 to $299.95.** Line of long-lived, external PowerBook battery packs, each of which lets you work for three to five times as long as the usual PowerBook battery. Unfortunately, the System 7 power manager periodically alerts you that your battery is not charging and dims the screen though battery pack has hours of time left. Mar 94

★★★ **RCD-202, Pinnacle Micro, 714/727-3300, $3995.** Writable CD-ROM drive is good for archiving data simply and inexpensively, but it's incompatible with many hard drives. Mar 94

★★★ **ScanMaker 35t, Microtek, 213/321-2121, $1999.** Speedy 35mm film scanner accommodates loose film and delivers a good image, but the included software is weak. Dec 93

★★★ **5canPlus Color 6000 for Mac, PlusTek U5A, 408/980-1234, $749.** Small, inexpensive sheet-fed color scanner is not appropriate if exact color matching is critical, but it is otherwise a good, economical option. Sep 93

★★★★ **ThinPack, VST Power 5ystems, 508/287-4600, $199.95.** External battery pack for PowerBooks is compact, with a lightweight design. It comes with handy power-management utilities. Mar 94

★★★ **TrakMate, Key Tronic Corp., 509/928-8000, $149.** Input device integrates a trackball into a wrist pad. While the design is interesting, it's not for everyone. Feb 94

★★★ **The UnMouse, MicroTouch 5ystems, 508/659-9000, $199.** Input device is a cursor-control device, programmable keypad, and small graphics tablet in one, and can be programmed with 60 macros (although only 16 can be selected by sight). It's ergonomically better than a mouse, but not as good as a trackball. May 93

★★★ **Yamaha TG100, Yamaha Corp. of America, 714/522-9011, $449.** Compact, keyboardless, multitimbral MIDI synthesizer adheres to the General MIDI standard patch arrangement. Although it won't convince you that you're hearing a live orchestra, the sound is about as realistic as low-cost MIDI gets. Apr 93

★★★★ **Yamaha Y5T-M10 Powered Monitor 5peakers, Yamaha Corp. of America, 714/522-9240, $149.95.** Powered speakers have a good, balanced sound and a great volume range at an outstanding price. Apr 94

MODEMS/NETWORK HARDWARE

★★★★ **AsantéHub 1012, Asanté Technologies, 408/435-8388, $1299.** This 12-port, 10BaseT Ethernet hub works right out of the box and is a premium device at a bargain price. Dec 93

★★★ **DataLink PB; Axcell Cellular Interface, Applied Engineering, 214/241-6060, $824.** If you need a full-blown office on the beach, this PowerBook cellular-modem package with automatic answering machine is a well-executed solution. Each recorded second requires 25K of disk space. Nov 93

★★★ **PerFit Port-A-Com, PerFit, 303/530-7333, $349.** Compact, ADB-powered, high-speed fax/data modem is difficult to configure, due to its Spartan and poorly organized documentation, but is still a solid product at a reasonable price. Nov 93

★★★ **5upraFaxModem 144PB, 5upra Corp., 503/967-2400, $349.95.** Looking for a high-speed internal modem for your PowerBook? Want to save a few bucks? This modem is worth considering. Disabling its fax software solved occasional transfer problems. Nov 93

PRINTERS

★★★ **Apple Color Printer, Apple Computer, 408/996-1010, $2349.** If you need large-format color output, but not precision color-matching, this well-built printer is a reasonable choice, although it doesn't support PostScript. Aug 93

★★★★ **Apple Portable StyleWriter, Apple Computer, 408/996-1010, $439.** Sleek, portable ink-jet printer weighs 4½ pounds and is a pleasure to use. It uses standard StyleWriter cartridges. Jan 94

★★★★ **DEClaser 1152, Digital Equipment Corp., 508/493-5111, $999.** Four-pages-per-minute, 300-dpi, PostScript Level 2 printer offers simultaneous support for Macs and PCs, plus excellent image quality, for a ground-breaking price. May 93

★★★★ **DeskWriter 310, Hewlett-Packard, 800/752-0900, $379 to $455.** Versatile, low-cost ink-jet printer is a 4.3-pound, battery-powered portable. With its 60-page sheet feeder, it's also a great desktop printer; and with a $49 color print cartridge, it offers inexpensive three-color printing. Mar 94

★★★ **LaserWriter Pro 600 and 630, Apple Computer, 408/996-1010, $2099 to $2529.** From their paper handling to their print quality, these laser printers are Apple's best. Unfortunately, they don't support emulation-sensing, and thus may be less desirable for mixed-platform offices than other possibilities. Jun 93

★★★★ **LaserWriter Select 300, Apple Computer, 408/996-1010, $839.** Inexpensive, low-capacity printer is networkable, and an excellent buy, despite a few weaknesses. Add a 4MB SIMM to take advantage of the amazing PhotoGrade capabilities, which allow the printer to generate 91 shades of gray. Aug 93

★★ **LaserWriter Select 310, Apple Computer, 408/996-1010, $1099.** This big, slow printer is a true Adobe PostScript printer with both Mac and DOS ports, but it's not networkable or compatible with the Communications Toolbox, it can't automatically switch ports, and it doesn't have adjustable paper guides. Aug 93

★★★★★ **LaserWriter 5elect 360, Apple Computer, 408/996-1010, $1599.** Low-cost, high-performance, 10-ppm printer is perfect for small LocalTalk or mixed networks. For bigger networks, consider buying more than one; they're more cost-effective than a 20-ppm printer. Apr 94

★★★ **MobileWriterP5, Mannesmann Tally Corp., 206/251-5524, $999.** Fast, portable printer is currently the only PostScript portable available. While the print quality is quite good on glossy laser paper, it's mediocre on inexpensive bond. Dec 93

★★★ **Phaser 200i Color Printer, Tektronix, 503/682-7377, $5995.** This thermal-wax color printer

continues

Star Ratings

is fast and compact, with versatile paper-handling features. TekColor image-enhancement technologies provide excellent output quality that is, however, poor on letterhead and inexpensive photocopier bond. Aug 93

★★ **PrintPartner 10W, Fujitsu Computer Products, 408/432-6333, $2450.** While this multiplatform printer is fast and prints clearly, many Mac users will find it frustrating as it can't print some TrueType fonts. Jul 93

★★★★ **StyleWriter II, Apple Computer, 408/996-1010, $359.** Apple's ink-jet printer retains the best features of its predecessor, but costs less. New features, such as gray-scale printing and the ability to share the printer over a network, make it even more versatile. Jun 93

★★★ **WriteMove II, GCC Technologies, 617/275-5800, $599.** Portable printer for the PowerBook measures 11½ by 2 by 3½ inches and weighs 2½ pounds. It's no speed demon, but it's fine for short jobs. May 93

SYSTEMS/STORAGE

★★★ **Centris 610, Apple Computer, 408/996-1010, 4/80 $1859.** Slim-design Mac uses a 20MHz 68LC040 processor at a price-to-performance ratio that comes close to competing with Windows PCs; however, its expandability is severely limited. Jun 93

★★★★ **Centris 650, Apple Computer, 408/996-1010, 4/80 68LC040 $2699.** Moderately priced but fast 040 system offers three expansion slots and one drive bay, and (except for the base model) has built-in Ethernet, video circuitry, and a math coprocessor. Jun 93

★★★★ **DataPak 105, Mass Microsystems, 408/522-1200, $949 to $1049.** Well-built 105MB SyQuest drive comes with a decent, no-frills cartridge-formatting package and a copy of 7th Heaven. The preformatted cartridges have a lifetime warranty. Sep 93

★★★ **Duo Dock, Apple Computer, 408/996-1010, $1079.** Clever housing for Duos provides back-panel connectors, a SuperDrive, support for external monitors, and two expansion slots. Some details, such as the difficulty of installing NuBus boards, belie Apple's usual attention to detail. Mar 93

★★★ **Expert Pad PI-7000, Sharp Electronics Corp., 800/993-9737, $899.** Personal digital assistant features the advantages of the Newton, in a better industrial design and at a comparative price. If the battery lasted longer and the message network were implemented, the PDA revolution could begin. Feb 94

★★★★ **FastCache Quadra, Daystar Digital, 404/967-2077, $279 to $399 .** PDS board provides 128K of secondary cache for a Quadra. The average real-world speed improvement is 15 percent, but some operations benefit more from the cache card than others. May 93

★★ **HP Optical Disk Library 10LC, Hewlett-Packard, 800/752-0900, $9495.** Optical jukebox may fill the need for 10 gigabytes of online storage, but its performance is poor, and the software lacks the features needed for adequate management. Jan 94

★★★★ **Infinity 105 Turbo, Peripheral Land, 510/657-2211, $795 to $894.** Small, light, quiet, inexpensive 105MB SyQuest drive is ingeniously packaged and ideal for both desktop and PowerBook use. Sep 93

★★★ **Infinity Optical 3.5, Peripheral Land, 510/657-2211, $1999.** If you need the extra measure of permanence that magneto-optical storage provides—or a compact alternative to bulky cartridges—this drive, based on a Sony mechanism and using 3½ -inch disks that store 120MB of data, deserves a look. Jun 93

★★★★ **LC III, Apple Computer, 408/996-1010, 4/80 $1349.** Base system comes equipped with a 25MHz 68030 processor and 512K of VRAM. This is a machine that fits the bill and the pocketbook of most home users and small-business owners. Jul 93

★★★ **MicroMac Plus Upgrade System, MicroMac, 714/362-1000, $499.** This 68030 accelerator for the Mac Plus requires disassembling a Plus and using the Plus system board to assemble the MicroMac system. It speeds up the Plus dramatically, and supports an included external full-page monochrome monitor. Jun 93

★★★★ **MultiDisk 150, Iomega, 801/778-1000, $699.** Durable cartridges are one of the strongest reasons to choose this Bernoulli removable drive. Although it's slightly more expensive than a SyQuest drive, it's fast and reliable, and the disks are competitively priced. Jun 93

★ **NuTek Duet, NuTek USA Corp., 408/973-8799, $2996.** Mac workalike is both a PC and a Mac in a single box, but because of many incompatibilities and problems, the Duet is not a computer anyone should consider using for serious work. Feb 94

★★★ **OrangePC, Orange Micro, 714/779-2772, $1799.** NuBus board has a DOS processor, letting you have your Mac and a PC, too. It's fairly well executed, though there are some minor problems. Oct 93

★★★ **PLI 2.4 GB MiniArray, PLI, 510/657-2211, $4815.** Slick and elegant RAID drive worked beautifully in tests, but it costs more than other options, and the QuickSCSI board is sensitive to minor SCSI problems. Apr 94

★★★★ **PowerBook 140 F/25 Upgrade, Digital Eclipse Software, 510/547-6101, $399.** By changing the oscillators and adding an FPU, Digital Eclipse changes PowerBook 140s into 170s, minus the active matrix screen. While the upgrade seems expensive, it's the only way to extend the viability of a 140. Dec 93

★★ **PowerBook 165c, Apple Computer, 408/996-1010, 4/80 $3399.** The passive matrix screen of this color notebook computer is dull and has noticeable afterimages, but if your expectations are reasonable, the speedy processor provides a pleasant work environment. Jul 93

★★ **PowerBook 180c, Apple Computer, 408/996-1010, 4/80 $4169.** The active matrix screen of this color notebook computer is beautiful but so small that its usefulness is very limited. Sep 93

★★★★ **PowerBook Duo 210 and 230, Apple Computer, 408/996-1010, 210 (4/80) $1839, 230 (4/80) $2299.** Apple's smallest computers have the pleasing heft of hardbound books but pack the horsepower of 030 chips. Although the screen, keyboard, and trackball feel small, these computers virtually cry out to be picked up and used. Mar 93

★★★★ **PowerBook Duo 270c, Apple Computer, 408/996-1010, 4/240 $3099.** Notebook computer meets all the demands of power users; it weighs less than 5 pounds, features a color active matrix display, and offers longer battery life. The lack of a floppy drive can be inconvenient, though. Feb 94

★★★★ **Quadra 605, Apple Computer, 408/996-1010, 4/80 $979.** Never before has Apple offered so much performance for so little money. The performance and price of this 040-based machine match those of a standard 486SX-based Windows PC. Mar 94

★★★★ **Quadra 800, Apple Computer, 408/996-1010, 8/230 $4679.** Squat, yet curvy and attractive, this minitower system has fewer expansion opportunities than the Quadra 950, but just as much power. It's fast, slick, and moderately priced. Aug 93

★★★★ **Quadra 840AV, Apple Computer, 408/996-1010, 8/230 $4069.** Technological tour de force uses a 40MHz 68040 and an AT&T 3210 digital signal processor, and is brimming with sophisticated speech-recognition and audiovisual technology. Beware of some hardware and software incompatibilities. Dec 93

★★★★ **SledgeHammer2000FMF, FWB, 415/474-8055, $3179.** RAID drive is both fast and inexpensive. Although it can be a bit noisy when accessing data, it's a good deal. Apr 94

★★★ **SmartStack, Envisio, 612/628-6288, SmartSource $119; SmartModules $289 to $1379.** The SmartStack line of modular storage peripherals May be neatly stacked on top of a common power supply to reduce desktop clutter and cabling problems. Sep 93

★★★ **Turbo 040, DayStar Digital, 404/967-2077, $1899.** This accelerator card is equipped with the fastest 68040 chip available, and is as fast as or faster than any Mac in processor-intensive tasks. For the price, it may make sense just to buy a faster computer. Dec 93

VIDEO/DISPLAY

★★★ **AudioVision 14 Display, Apple Computer, 408/996-1010, $769.** Monitor integrates audio and video with built-in speakers that produce surprisingly rich, full-bodied sound. The display, while nice, is small for multimedia work. Dec 93

★★★ **Dycam Model 3, Dycam, 818/998-8008, $895.** Low-end, digital still camera is easy to use, and is a solid product if Instamatic grade gray-scale meets your image-quality requirements. Sep 93

★★★ **Editing Aces Suite, RasterOps, 801/785-5750, $3899.** Video professionals can record and play back full-screen movies in 24-bit color with 16-bit CD-quality sound with these products. Despite flaws, this package represents a step forward in QuickTime technology. Nov 93

★★★ **Intellicolor Display/20, Radius, 408/434-1010, $3199.** Although with its exceptional brightness and clarity this monitor would be a fine addition to any designer's desk, the included Intellicolor software, which lets you control the settings of your display, doesn't offer much added value. Apr 94

★★★ **Lightning Effects II, Spectral Innovations, 408/955-0366, $1295.** Digital-signal-processor chips dramatically speed up some Photoshop operations with this expensive Photoshop-acceleration board. It had problems acquiring some JPEG files. May 93

★★★ **L-TV, Lapis Technologies, 510/748-1600, $349.** Interface board allows a Mac LC, LC II, or Performa to use a TV as a display. Unfortunately, a TV is a poor substitute for a monitor, so while the L-TV does its job, the setup is unsuitable for many applications. May 93

★★★★ **MovieMovie, Sigma Designs, 510/770-0100, $349.** This 7-inch NuBus video-capture board may be what you've been waiting for. The price is right, and the addition of on-board audio input is a plus, even if it is only mono. Dec 93

★★★ **PaintBoard Turbo, RasterOps, 408/562-4200, $1499.** Midrange video board supports 24-bit color on monitors up to 17 inches and resolutions as high as 1024 by 768 pixels. If you can live without changing resolutions on the fly, it's a reasonably good deal. Oct 93

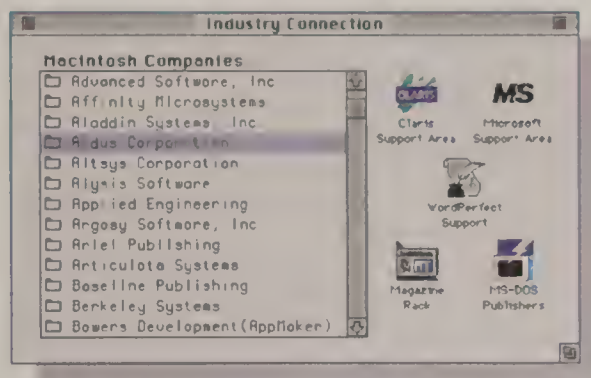
★★★★ **ThunderStorm, SuperMac Technology, 408/541-6100, $699.** Photoshop-acceleration board uses digital-signal-processor chips to speed up some Photoshop operations. It's fast, with good JPEG compatibility and a great manual. May 93

★★★ **VideoToolkit 2.0.1, Abbate Video, 508/376-3712, $279.** Despite a few rough edges, this is an attractive, inexpensive solution for those who need to catalog and edit videotapes on a budget. Sep 93

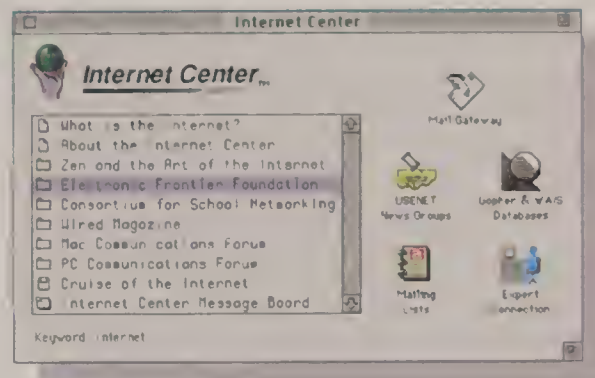
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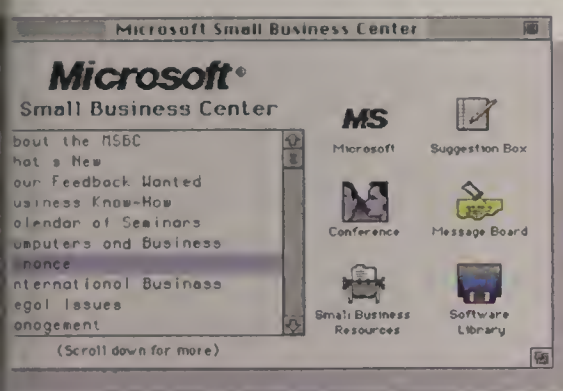
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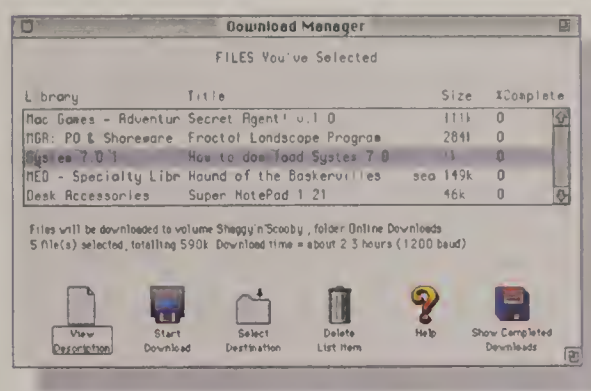
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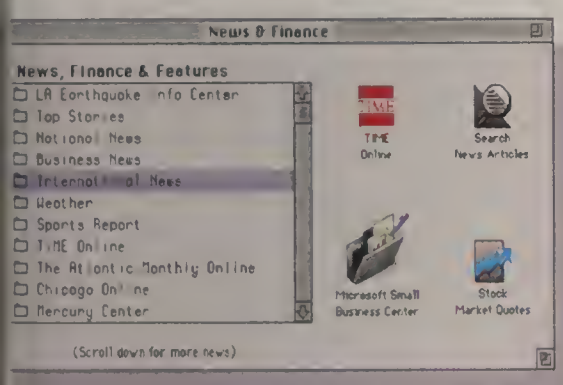
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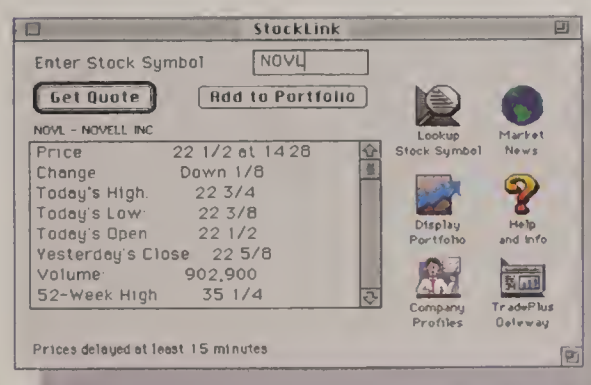
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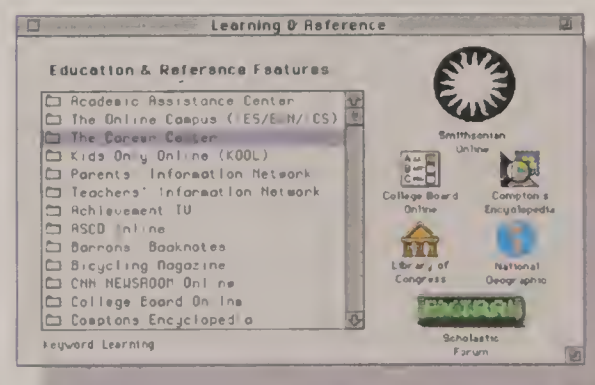
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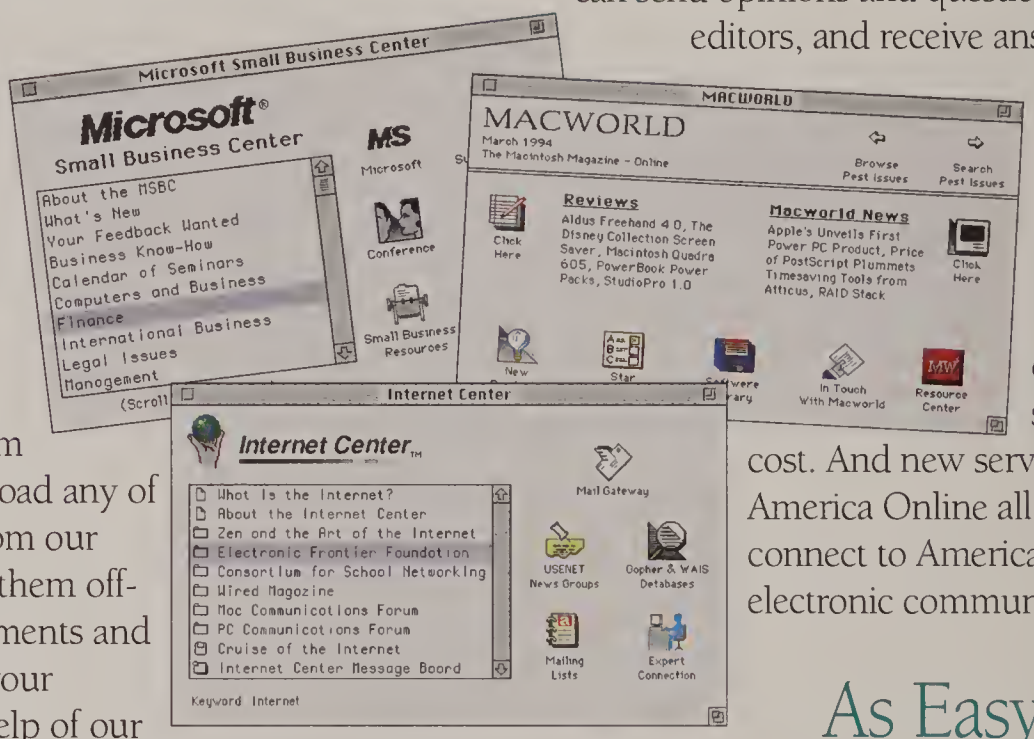
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Selected and edited by Charles Barrett

The following listings represent special promotions being sponsored by Macintosh vendors and their resellers. Each listing indicates which products have been awarded a star rating in *Macworld's Reviews* (products rated ★★ or lower are not eligible for inclusion), have been selected as an Editors' Choice, or have won a World-Class award. In some cases, the editorial evaluation quoted is for an earlier product version.

When placing an order, please mention that you saw the offer in *Macworld*. Should any problems arise, contact the *Streetwise Shopper* editor by fax (415/442-0766), phone (415/978-3241), or mail (*Macworld*, 501 Second St., San Francisco, CA 94107).

Vendors and resellers desiring to have products and services included in this section are encouraged to contact the *Streetwise Shopper* editor with particulars.

BUNDLES

DuoMate 16sc + PowerPath RasterOps is bundling Farallon's $149 PowerPath software (PhoneNet StarConnector LocalTalk connectors not included), which enables PowerBook users to connect to Ethernet and Token Ring LANs, with its $649 DuoMate 16sc PowerBook Duo docking station, featuring video output, DB-25 SCSI port, and floppy drive port (current DuoMate 8 and 16sc users can add PowerPath for $79). Call 800/729-2656 to order or for more information.

FilmPrinter turbo II + Astound 1.0 Mirus Industries is including a free copy of Gold Disk's $399 Astound multimedia presentation application (Nov 93 ★★★★) with its $6995 FilmPrinter turbo II slide maker (Aug 92 "Slides while You Wait" Editors' Choice). Call 800/942-9770 to order or for more information.

iSpy + iMovie + iMail + Action 1.0 + VideoShop 2.0 SE Axion is including Macromedia's $495 Action multimedia-integration program (Mar 93 "First-Time Authoring" Editors' Choice; Feb 93 ★★★★), a special edition (limited to 320-by-240-pixel captures) of Avid Technology's $499 Avid VideoShop QuickTime video-editing program (Feb 94 ★★★), plus the $159 iMail video-mail application for recording and playing back QuickTime movies (allows System 7 Pro users to send and receive video mail) free with a $799 bundle consisting of its iSpy desktop full-motion color video/still-picture camera and iMovie digital video and audio (16-bit, 44.1kHz) capture board which provides real-time hardware compression. For further information, call 800/829-4661.

Home Office Suite Five applications have been combined into a $599 suite of integrated productivity tools consisting of WordPerfect's $495 WordPerfect for Macintosh 3.0 word processor (Mar 94 ★★★★), DeltaPoint's $195 DeltaGraph Pro 3 charting and graphing package (May 92 ★★★★ for version 2.0, 1993 World-Class), Intuit's $69.95 Quicken 4 personal finance package (Nov 93 ★★★★), ChipSoft's $69.95 MacInTax personal tax-preparation program (May 93 ★★★), and Advanced Software's $99.95 Intouch 2.0 address book and reminder desk-accessory (Feb 93 ★★★; 1993 World-Class). Street pricing is expected to be under $200. Resellers include CompUSA (800/451-7638), Computer City (800/826-3928), and Egghead Software (800/344-4323).

Macintosh Quadra 605 + ClarisWorks 2.0 CompUSA is preinstalling a free copy of Claris's $299 integrated software package (Aug 93 ★★★★, 1993 World-Class) on its Quadra 605 systems (Mar 94 ★★★★). To locate the nearest retail outlet, call 800/266-7872. *Offer expires 12/31/94.*

MegaToons I + MegaToons II Canned Art Connection is offering Creative Media Services' $265 CD-ROM bundle of over 1200 business cartoons by syndicated illustrator Phil Frank for $199 (regularly $238.50). Call 800/455-4278 for further details and to order. *Offer expires 5/31/94.*

Radius Stage Two Rocket + MacroModel + Three-D Radius is offering a $2399 3-D modeling and animation bundle consisting of Macromedia's $1495 MacroModel modeling tool for multimedia, graphics, and product design (May 94 ★★★★) and its $1495 Three-D for animating and rendering those modeled images, plus a $1999 Radius Stage Two Rocket 33MHz accelerator board. Call 800/227-2795 for product and reseller information.

SAM 3.5.8 + AutoDoubler 2.0 Symantec Corporation's $89.95 AutoDoubler compression utility for doubling hard disk space is being included free with the purchase of the $99 Symantec AntiVirus for Macintosh (SAM) program for virus prevention, detection, and elimination (Mar 94 ★★★★; 1993 World-Class). Available through resellers including MacConnection (800/800-4444), MacWarehouse (800/255-6227), Mac Zone (800/248-0800), and Mac's Place (800/260-0009). *Offer not to expire before 4/30/94.*

ScanMaker IIG + OmniScan Software Edition Microtek Lab is bundling a multifunctional software tool package from Caere Corporation with its $649 ScanMaker IIG gray-scale flatbed scanner (effective 3/31/94). Tools include Caere's OmniPage Direct OCR software, an Image Assistant GS gray-scale image-editing system; and FaxMaster fax-transmission software. For more information, call 800/654-4190.

SIDEGRADES/UPGRADES

Virex 5.0 Datawatch Corporation is offering this $99.95 antivirus utility (May 94 ★★★★) for $39.95 to users of Symantec AntiVirus for Macintosh (SAM) or Central Point Software's MacTools. Call MacWarehouse (800/225-6227) or Datawatch (919/549-0711) for qualification requirements and to order. *Offer expires 6/30/94*

WordPerfect 3.0 for Macintosh WordPerfect Corporation is offering this new version of its $495 word processor (Mar 94 ★★★★) to users of any competing product for $99. Order direct (800/321-4566) or through resellers. For more information, call 800/451-5151

DISCOUNTS/REBATES/FREE OFFERS

ARCserve for Macintosh Cheyenne Software is offering a special introductory price of $125 on the $245 five-user version of this high-performance backup software for workgroup and stand-alone computers that works with most tape and optical drives. Call 800/243-9462 for product and reseller information. *Offer expires 5/31/94.*

Bernoulli 90MB/150MB Drives Iomega has reduced its Bernoulli removable-cartridge drive retail prices: MacTransportable 90 Pro from $589 to $419; Transportable 90 Pro from $599 to $499; Dual 90 Pro from $1099 to $999; MacTransportable 150 from $699 to $599. Single cartridges go from $119 to $112 (three-packs from $357 to $323). For more information, call 800/456-5522.

Bookends Pro 3.0 Westing Software is offering this $149 bibliography-management software, which automatically generates bibliographies and footnotes to strict journal specifications, direct for $79. Call 800/325-1862 for further information and to order. *Offer expires 5/31/94.*

CorrectPrint 300i Printer RasterOps has reduced retail prices on this dye-sublimation printer (May 93 "Dye-Sublimation") from $6499 down to $3999 for the 16MB version and from $9249 down to $4999 for the 32MB version. For more information, call 800/729-2656.

MasterJuggler Alsoft is offering the full version of this $49 utility (Apr 94 "Top Utilities")—an alternative to Suitcase that provides users with access to unlimited numbers of fonts, DAs, F-keys, and sounds—for $14.95. Call Alsoft at 800/257-6381 to order. *Offer expires 5/31/94.*

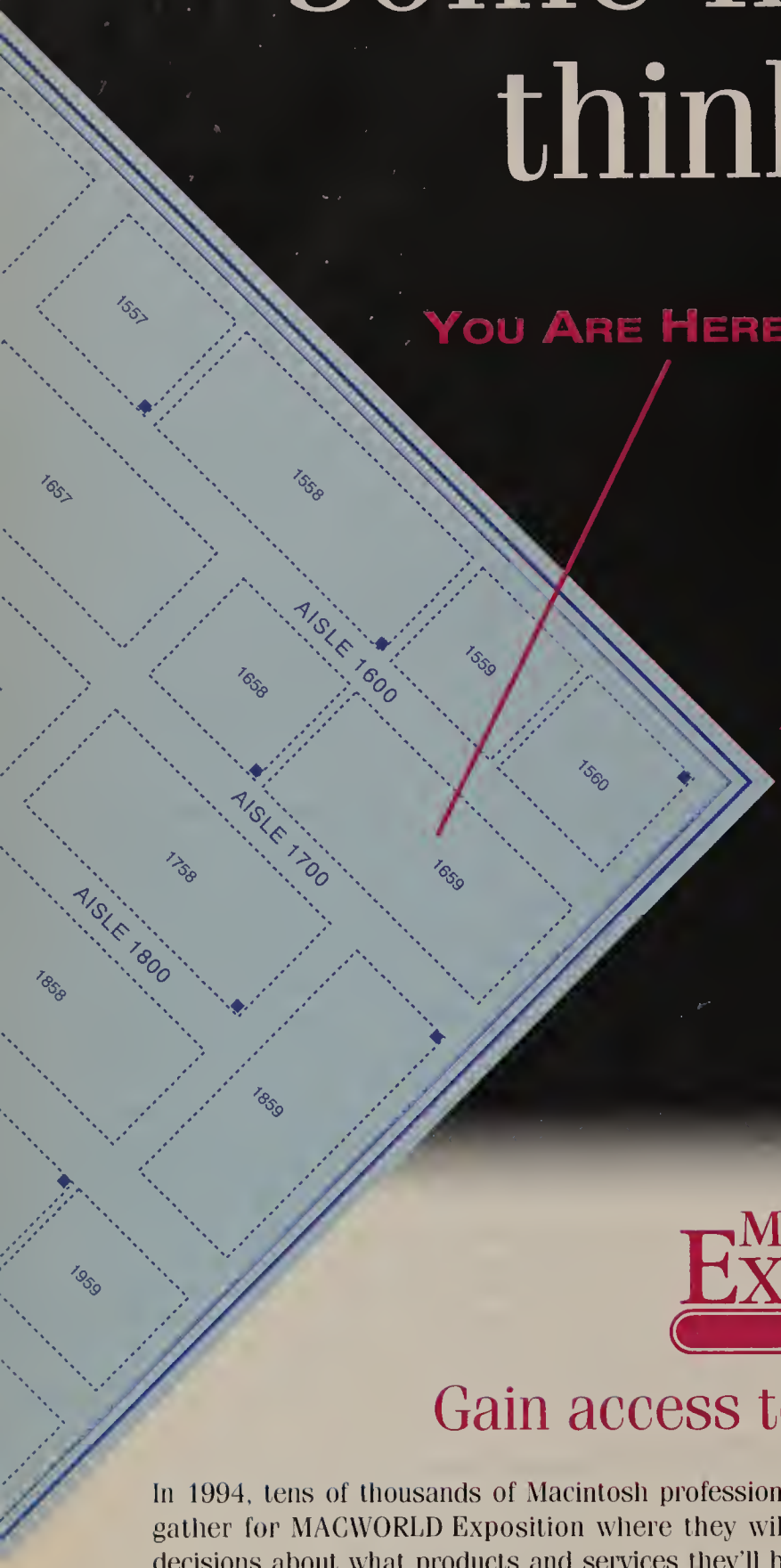
PhoneNet connectors Farallon Computing is offering a PhoneNet Bonus Pack of three $36.99 connectors for the price of two ($69). PhoneNet connectors are for networking Macintosh computers, printers, servers, and Newton MessagePads together using ordinary telephone wire. For reseller information, call 800/859-7761. *Offer not to expire before 6/30/94.*

StrataVision 3d 3.0 Strata has reduced the retail price of this $995 3-D modeling, rendering, and animation program (Feb 94 ★★★ for version 2.6.3) to $695. For more information, call 800/678-7282.

Troll Touch PB Troll Technology is offering a special $495 introductory price on this complete $695 touch-screen system for the Apple PowerBook 180c. Troll integrates a resistive screen onto the PowerBook's LCD. The system comes with Troll's Touchstar software and an ADB controller box neatly mounted onto the lid with its own AD8 port. Call 805/295-0770 to order. *Offer expires 5/31/94*

TurboPS Laser Printers NewGen Systems has reduced retail prices by $1000 on its TurboPS/660 B (Feb 94 "Workgroup Printers") and 1200B laser printers to $3995 and $4995 respectively. In addition, pricing for the TurboPS/440 B has been lowered by $500, to $3495. For more information, call 714/641-8600. m

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10	Agio Designs	—	800/688-2446
46	Aladdin Systems	195	408/761-6200
214-215	Alliance Peripheral Systems	62	800/874-1428
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14	Anthro Corporation	—	800/325-3841
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53	Apple Computer	—	—
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71	Apple Computer	—	—
114-115	Apple Computer	—	—
143-145	Apple Computer	—	—
51	Best!Ware	4	800/851-1315
210-211	Bottomline Distribution	63	512/472-4956
74	Canon USA	110	800/OK-CANON
170	CD ROM Expo	—	—
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216-217	Club Mac	96	800/CLUBMAC
9	Communication Intelligence Corp.	—	800/888-9242
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42	CTX International	38/39	909/595-6146
66	Dantz Development	26	510/253-3000
146	DataViz	79	800/733-0030
159	Dayna Communications	161	800/443-2962
34	DayStar Digital	7	800/972-8711
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SOFTWARE

BUSINESS

Page No.	Advertiser	Reader Srvc. No.
52	Aatrix Software	159
47	Apple Computer	—
49	Apple Computer	—
53	Apple Computer	—
114-115	Apple Computer	—
51	Best!Ware	4
76	Delrina Technology	137
28	Inspiration Software	104
IFC-1	Microsoft	—
135	Statsoft	99
149	Systat	29
32-33	Wordperfect Corporation	—

CAD/CAM

Page No.	Advertiser	Reader Srvc. No.
10	Engineered Software	12

CD ROM

Page No.	Advertiser	Reader Srvc. No.
11	Corel Corporation	78
248-249	Educorp	157

COMMUNICATION

Page No.	Advertiser	Reader Srvc. No.
46	Aladdin Systems	195
146	DataViz	79
76	Delrina Technology	137

EDUCATIONAL

Page No.	Advertiser	Reader Srvc. No.
244-247	Quality Computers	263

GRAPHICS/DTP

Page No.	Advertiser	Reader Srvc. No.
53	Apple Computer	—
11	Corel Corporation	78
60	HSC Software	5
54-55	Macromedia	21
20	Pixar	13

MISCELLANEOUS

Page No.	Advertiser	Reader Srvc. No.
44	GDT Softworks	32/42
28	Inspiration Software	104

MULTIMEDIA

Page No.	Advertiser	Reader Srvc. No.
54-55	Macromedia	21
20	Pixar	13

STATISTICAL

Page No.	Advertiser	Reader Srvc. No.
135	Statsoft	99
149	Systat	29

UTILITIES

Page No.	Advertiser	Reader Srvc. No.
46	Aladdin Systems	195
66	Dantz Development	26
44	GDT Softworks	32/42
82	Insignia Solutions	68
30	Now Software	—

VERTICAL

Page No.	Advertiser	Reader Srvc. No.
52	Aatrix Software	159

WORD PROCESSING

Page No.	Advertiser	Reader Srvc. No.
24-25	American Power Conversion	72
32-33	Wordperfect Corporation	—

HARDWARE

BOARDS

Page No.	Advertiser	Reader Srvc. No.
72	Radius	14
64	RasterOps	191
151	RasterOps	90

CD ROM

Page No.	Advertiser	Reader Srvc. No.
221	SuperMicro	126
248-249	Educorp	157

COMPUTER SYSTEMS

Page No.	Advertiser	Reader Srvc. No.
69	Apple Computer	—
71	Apple Computer	—
114-115	Apple Computer	—
210-211	Bottomline Distribution	63
90-91	Computer Discount Warehouse	2
220	CRA Systems Incorporated	20
211	DGR Technologies	65
204-205	Express Direct	81
2-3	Intel Corporation	—
207	Third Wave	186

DIGITIZERS/SCANNERS

Page No.	Advertiser	Reader Srvc. No.
203	Digital Axis	83
6-7	Epson America	—
108-109	Focus Enhancements	163
122-123	Mirror Technologies	58
13	Umax Technology	196

DISPLAYS

Page No.	Advertiser	Reader Srvc. No.
220	CRA Systems Incorporated	20
42	CTX International	38/39
203	Digital Axis	83
108-109	Focus Enhancements	163
137	Mitsubishi Corporation	261
208-209	MacNews	172
122-123	Mirror Technologies	58
212	Mobius Technologies Inc.	109
IBC	NEC Technologies	16
22	nView Corporation	117
160	Proxima Corporation	47

EXPANSIONS/UPGRADES

Page No.	Advertiser	Reader Srvc. No.
34	DayStar Digital	7
212	Mobius Technologies Inc.	109
64	RasterOps	191

HARD DISKS/STORAGE

Page No.	Advertiser	Reader Srvc. No.
214-215	Alliance Peripheral Systems	62
210-211	Bottomline Distribution	63
216-217	Club Mac	96
23	Contemporary Cybernetics Group	188
211	DGR Technologies	65
203	Direct Connections	121
154	Iomega	111
15-19	La Cie	52
206	Mac Products USA	175
41	Pinnacle Micro	178
175	Power City	200
213	Pro Direct	135
221	SuperMicro	126

INPUT DEVICES

Page No.	Advertiser	Reader Srvc. No.
9	Communication Intelligence Corp.	—
BC	Kensington Microware Ltd.	—

MISCELLANEOUS

Page No.	Advertiser	Reader Srvc. No.
9	Communication Intelligence Corp.	—
BC	Kensington Microware Ltd.	—

NETWORKING

Page No.	Advertiser	Reader Srvc. No.
24-25	American Power Conversion	72
159	Dayna Communications	161

POWERBOOK

Page No.	Advertiser	Reader Srvc. No.
165	Technöggin, Inc.	94
30	VST Power Systems	73

PRINTERS

Page No.	Advertiser	Reader Srvc. No.
143-145	Apple Computer	—
74	Canon USA	110
163	Citizen America Corporation	185
88-89	Eastman Kodak	45
118-119	Hewlett Packard	—
132	Lasermaster	43
29	QMS Inc.	—
80	Tektronix	143
60	Xante Corp.	1

VIDEO

Page No.	Advertiser	Reader Srvc. No.
72	Radius	14
151	RasterOps	90

SERVICES

ON LINE

Page No.	Advertiser	Reader Srvc. No.
26	CompuServe	66

TRADESHOWS/CONFERENCES

Page No.	Advertiser	Reader Srvc. No.
170	CD ROM Expo	—
176	Digital World	—
8	Graphix Zone	—
190	Macworld Expo	—
243	Macworld Expo-DC	—
166	Strictly Business Computer Expo	—

TRAINING

Page No.	Advertiser	Reader Srvc. No.
78	MacAcademy	106

ACCESSORIES

FURNITURE

Page No.	Advertiser	Reader Srvc. No.
10	Agio Designs	—
14	Anthro Corporation	—
12	ScanCo	—

MISCELLANEOUS

Page No.	Advertiser	Reader Srvc. No.
12	ScanCo	—

MAIL ORDER

Page No.	Advertiser	Reader Srvc. No.
214-215	Alliance Peripheral Systems	62
90-91	Computer Discount Warehouse	2
216-217	Club Mac	96
203	Direct Connections	121
204-205	Express Direct	81
85-87	MacConnection	—
195-202	MacMall	131
208-209	MacNews	172
218-219	MacWarehouse	150
136	Mac's Place	250
206	Mac Products USA	175
175	Power City	200
213	Pro Direct	135
244-247	Quality Computers	263
207	Third Wave	186

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- 01 ❑ 1000+
- 02 ❑ 999 - 100
- 03 ❑ 99 - 25
- 04 ❑ Under 25

B. Which of the following computers are installed at this entire work-site? (Check all that apply.)

- 05 ❑ Apple Workgroup Servers/ Mac Quadra-series
- 06 ❑ Mac Centris-series/II-series/LC III/ Performa 600/450/SE 30
- 07 ❑ Mac LC/LC II/Performa 430/405/ 400/200/Classic-series/SE/Plus/ 512K/128K/Portable
- 08 ❑ Mac PowerBook-series/Duo-series

C. What is the total number of Macs installed at this entire work-site? (Check one.)

D. For how many Macintosh computers within this entire work-site do you have purchase involvement for products and/ or services? (Check one.)

	C	D
500+	❑ 09	❑ 15
499 - 100	❑ 10	❑ 16
99 - 50	❑ 11	❑ 17
49 - 10	❑ 12	❑ 18
9 - 1	❑ 13	❑ 19
None	❑ 14	❑ 20

E. In which ways are you ever involved in purchase decisions for Macintosh products at this entire work-site? (Check all that apply.)

- 21 ❑ Initiate/Determine need for product/capabilities/features
- 22 ❑ Evaluate, recommend, or approve brands/models
- 23 ❑ Evaluate, recommend, or approve purchase source
- 24 ❑ Authorize purchases

F. Over the next 12 months, how much will this entire work-site spend on Macintosh products and/or services? (Check one.)

- 25 ❑ $1 million or more
- 26 ❑ $999,999 – $500,000
- 27 ❑ $499,999 – $100,000
- 28 ❑ $99,999 – $50,000
- 29 ❑ $49,999 – $10,000
- 30 ❑ Under $10,000

G. Considering the entire work-site, which of the following Macintosh hardware and software products are currently installed? (Check all that apply.)

- 31 ❑ Business software (Word processing, spreadsheet, database, etc.)
- 32 ❑ Graphics/publishing software
- 33 ❑ Monitors/displays
- 34 ❑ Printers/scanners
- 35 ❑ Networking/communications hardware and/or software
- 36 ❑ Multimedia/AV hardware and/or software
- 37 ❑ Mobile computing products (PowerBooks, peripherals, software, etc.)

H. What is your primary job function? (Check one.)

- 38 ❑ Computer Reseller/VAR/VAD
- 39 ❑ MIS/DP/IS/Network Management
- 40 ❑ Engineering
- 41 ❑ R&D/Scientific
- 42 ❑ Corporate/General Management
- 43 ❑ Accounting/Finance
- 44 ❑ Marketing/Sales/PR/ Communications
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16	17	18	19	20	166	167	168	169	170
21	22	23	24	25	171	172	173	174	175
26	27	28	29	30	176	177	178	179	180
31	32	33	34	35	181	182	183	184	185
36	37	38	39	40	186	187	188	189	190
41	42	43	44	45	191	192	193	194	195
46	47	48	49	50	196	197	198	199	200
51	52	53	54	55	201	202	203	204	205
56	57	58	59	60	206	207	208	209	210
61	62	63	64	65	211	212	213	214	215
66	67	68	69	70	216	217	218	219	220
71	72	73	74	75	221	222	223	224	225
76	77	78	79	80	226	227	228	229	230
81	82	83	84	85	231	232	233	234	235
86	87	88	89	90	236	237	238	239	240
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101	102	103	104	105	251	252	253	254	255
106	107	108	109	110	256	257	258	259	260
111	112	113	114	115	261	262	263	264	265
116	117	118	119	120	266	267	268	269	270
121	122	123	124	125	271	272	273	274	275
126	127	128	129	130	276	277	278	279	280
131	132	133	134	135	281	282	283	284	285
136	137	138	139	140	286	287	288	289	290
141	142	143	144	145	291	292	293	294	295
146	147	148	149	150	296	297	298	299	300

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416	417	418	419	420	516	517	518	519	520
421	422	423	424	425	521	522	523	524	525
426	427	428	429	430	526	527	528	529	530
431	432	433	434	435	531	532	533	534	535
436	437	438	439	440	536	537	538	539	540
441	442	443	444	445	541	542	543	544	545
446	447	448	449	450	546	547	548	549	550
451	452	453	454	455	551	552	553	554	555
456	457	458	459	460	556	557	558	559	560
461	462	463	464	465	561	562	563	564	565
466	467	468	469	470	566	567	568	569	570
471	472	473	474	475	571	572	573	574	575
476	477	478	479	480	576	577	578	579	580
481	482	483	484	485	581	582	583	584	585
486	487	488	489	490	586	587	588	589	590
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496	497	498	499	500	596	597	598	599	600

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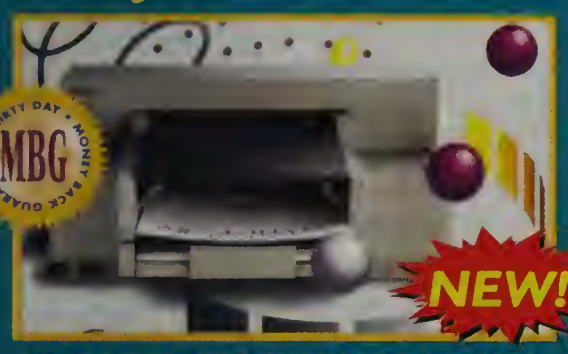
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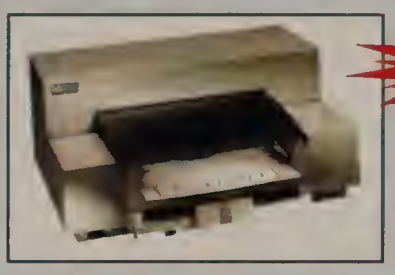
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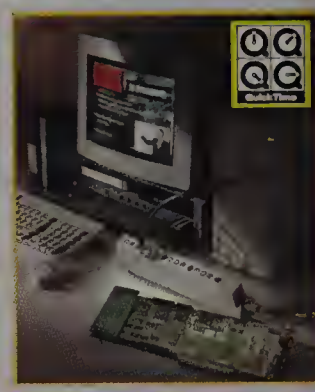
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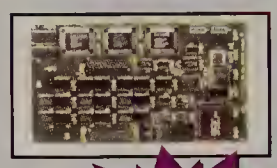
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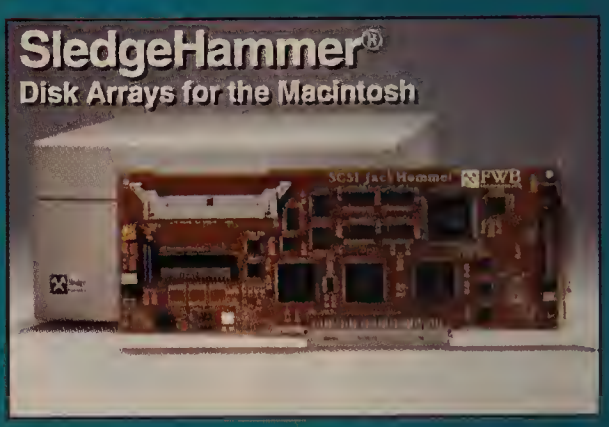
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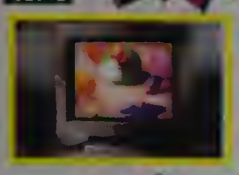
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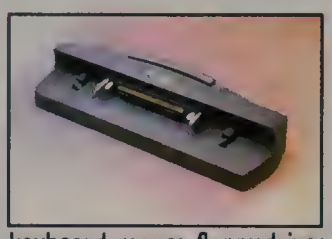
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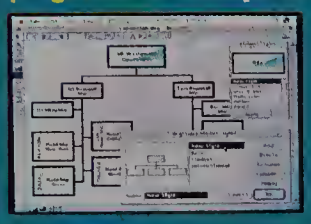
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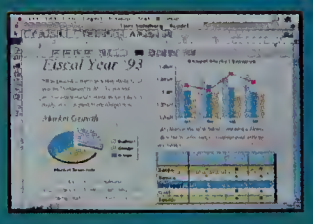
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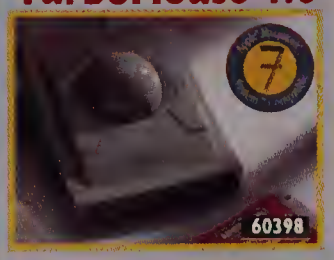
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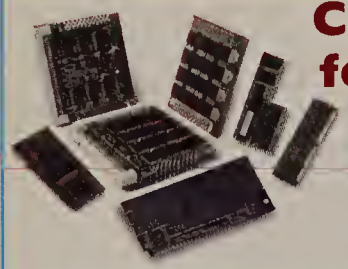
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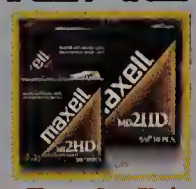


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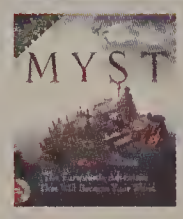
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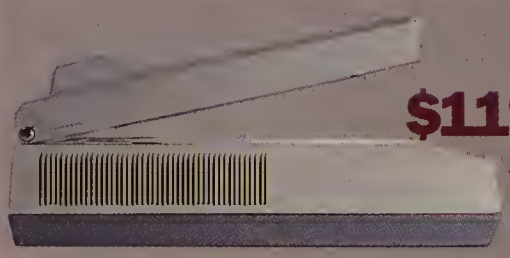
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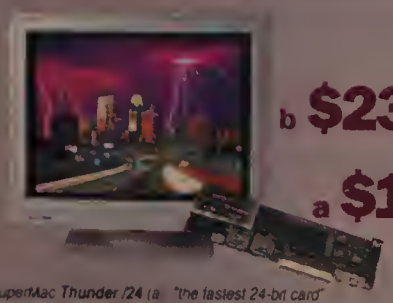
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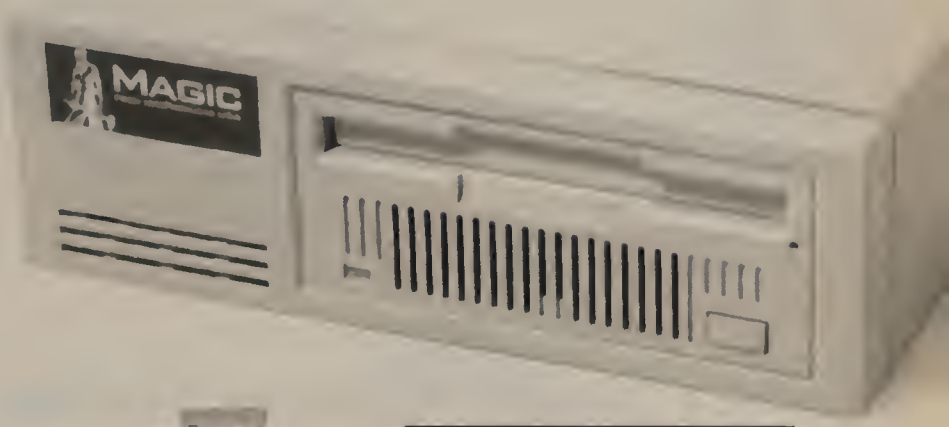
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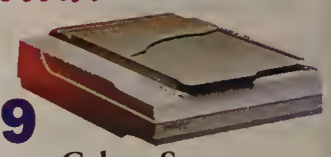


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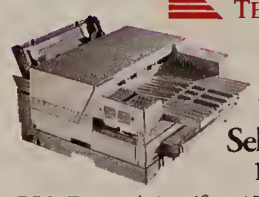
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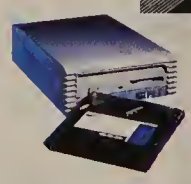
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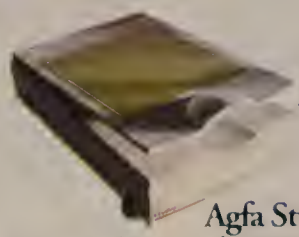
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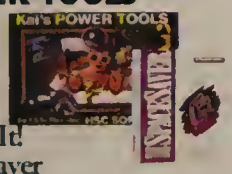
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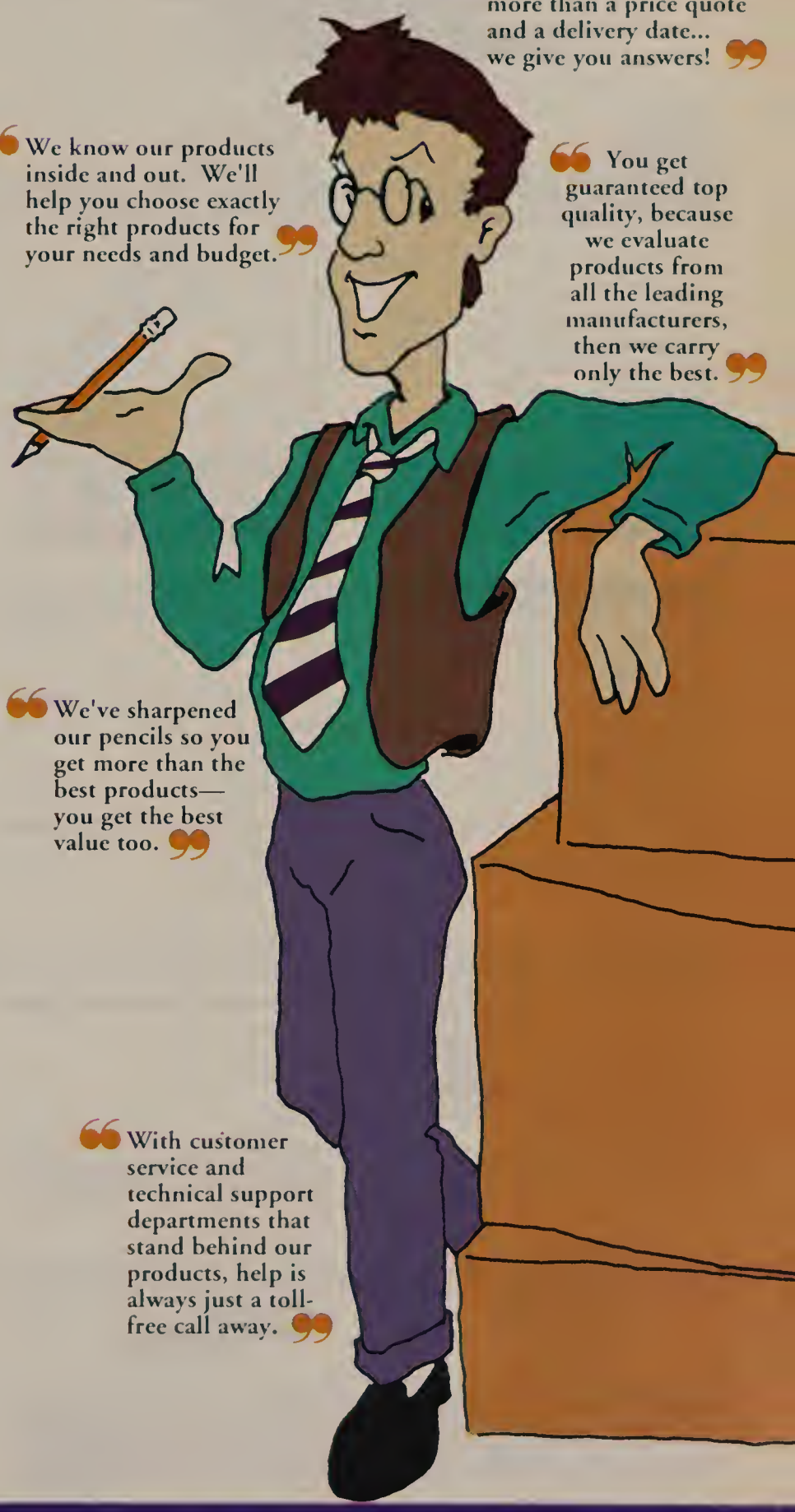
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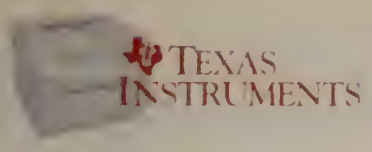
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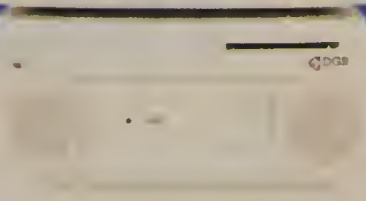
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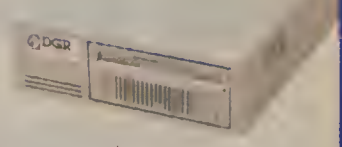
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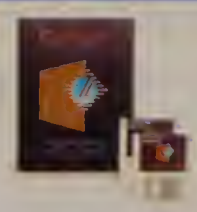
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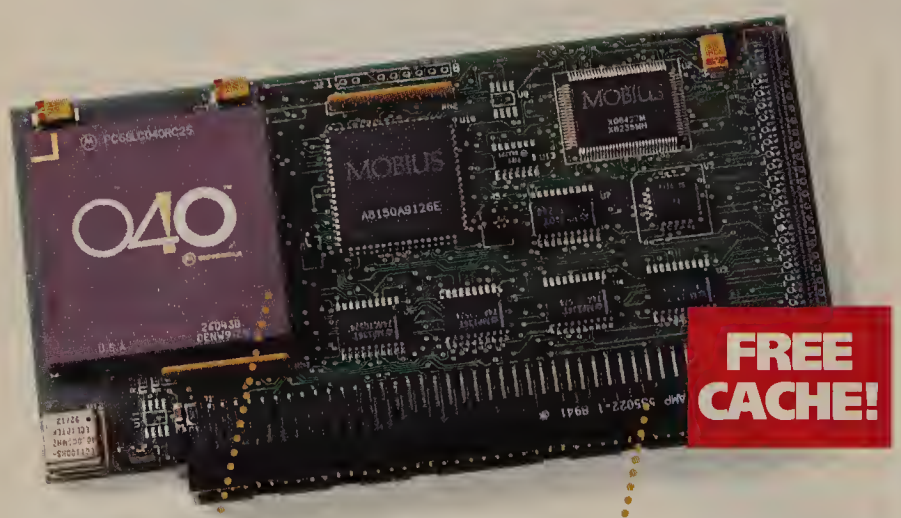
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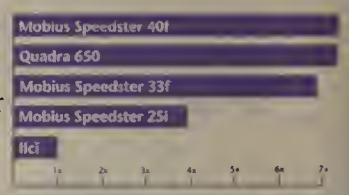
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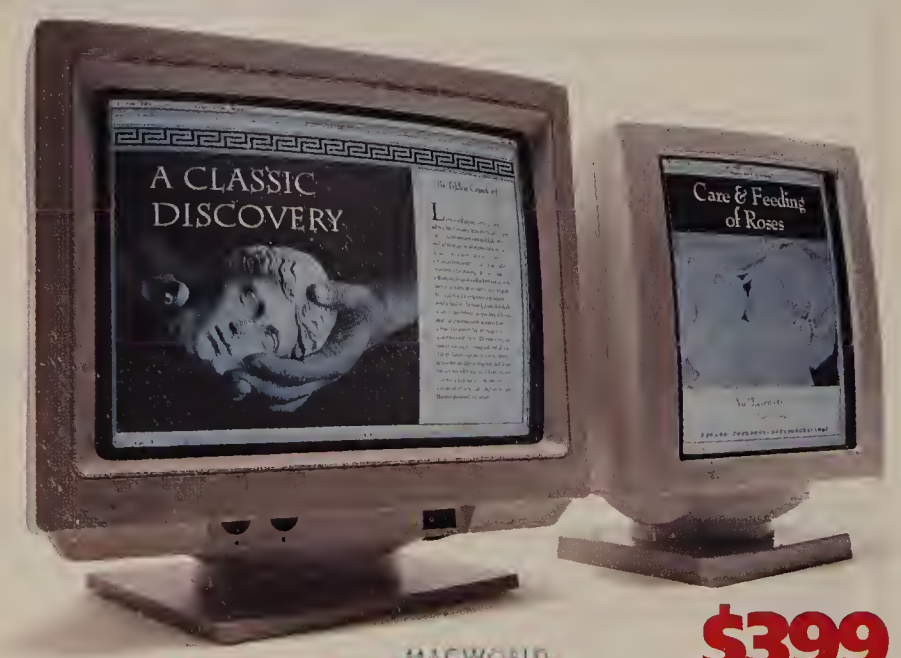


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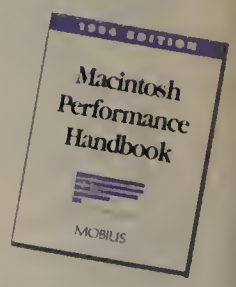
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540 MB	10ms	475	535

LPS and ELS series include a 2 year warranty.
GO drives include a 1 year warranty.

GO Drive Series

Capacity	Seek	Int.	Ext.
42 MB	17ms	99	155
127 MB	17ms	230	315
170 MB	17ms	255	335
256 MB	17ms	345	425

Empire and Pro Series

Capacity	Seek	Int.	Ext.
700 MB	10ms	775	835
1080 MB	10ms	835	895
1225 MB	10ms	965	1025
1800 MB	10ms	1085	1145

Includes 5 year factory warranty

FUJITSU Extremely Fast!

Capacity	Model	Int.	Ext.
240 MB	M2637 2.5" 14 MS, 1 Yr. War. SCSI-2	365	465
330 MB	M2622 3.5" 9 MS, 5 Yr. War. Fast SCSI-2	345	405
520 MB	M2624 F/A 3.5 "9 MS, 5 Yr. War. Fast SCSI-2	495	555
1.2 GB	M2694 ESA 3.5 "8.5MS, 5 Yr. War. Fast SCSI-2	865	925
2.4 GB	New Price 5.25 "11 MS, 5 Yr. War. Fast SCSI-2	1385	1485

DynaMO128 **128 MB** Dyna MO 30 MS, 3600 RPM SCSI-2 **$865**

Music & Multi Media Apps. Novell Certified

Capacity	Model		Specifications	Int.	Ext.
1.2 GB	M4110 Law Profile	3.5"	8 MS, 5400 RPM FAST SCSI-2	850	910
1.2 GB	M2210	3.5"	10 MS, 5400 RPM FAST SCSI-2	860	910
1.7 GB	M2217	3.5"	10 MS, 5400 RPM FAST SCSI-2	1165	1225
2.4 GB	M1926	5.25"	11 MS, 5 yr. War. Fast SCSI-2	1420	1520
3.6 GB	M1936	5.25"	11 MS, 5 yr. War. Fast SCSI-2	2135	2195
	Direct to Disk Recording AV Drives				
1.2 GB	M2210AV	3.5"	10 MS, 5400 RPM FAST SCSI-2	915	975
1.7 GB	M2217AV	3.5"	10 MS, 5400 RPM FAST SCSI-2	1215	1285
3.6 GB	M1936AV	5.25"	11MS, 5yr. War. Fast SCSI-2	2185	2285

COMPARE AND SAVE!
M 2217 1.7 GB **$1165** Only 68¢ per MB FORMATTED CAPACITY

- Less than 10ms seek time
- Transfers up to 10mb/sec.
- Fast SCSI-2
- 5 Year (HOT SWAP) Warranty
- 300,000 Hours MTBF

* Mean time between failure is the average life expectancy of the drive.

- COMES WITH QUADRA AV DRIVER

All drives came formatted and packaged with the latest SCSI Manager 4.3 compatible driver software. External drives came with a double shielded system cable and external terminatian.

Disk Arrays

PDI 2 GB Array **$3880**
Sustained Transfer Rate up to 6.5MB/second, RAID Level 0 Support
Mechanism: 2 - ST312000

PDI 3.2 GB Array **$4480**
Sustained Transfer Rate up to 8MB/secand, RAID Level 0 Support
Mechanism: 2 - ST 11950N Barracuda I Drives

PDI 4.2 GB Array **$5540**
Sustained Transfer Rate up to 9MB/second, RAID Level 0 Support
Mechanism: 2 - ST12550N Barracuda II Drives

PDI Disk Arrays includes **TWO** SCSI-2 Acceleratar cards and Striping Saftware fram Atto Technalagies All Disk Arrays have a 5 year warranty.

Capacity	Model		Int.	Ext.
1.2 GB	C2247	3.5"	$995	$1055
2.4 GB	C2490	3.5"	1995	2055
2.35 GB	C3010	5.25"	1975	2075
Optical Drives				
1.3 GB MO	C1716T	23.5ms	2599	2699

QMS PRINTERS

Model	Price
PS 410 4PPM,300DPI	$1399
2 MB, Hat Parts, PS L1 & HP-PCL, 45 Fants	
***PS 860 8PPM, 600 DPI, 11x17**	$3825
12 MB exp. 32 MB,39 Fants, PS L 1& 2, RISC Processar	
PS 1725 17PPM, 600 DPI, *New Price !	$4399
8 MB Exp. ta 32 MB, PS Level 1 & 2, RISC Processar	

*Netwark interfaces available far Ethernet/Talk,Taken Ring far Netware,TCP/IP, DECnet, Emulatian for DEC LN03, CCiTT Graup IV.

Capacity	Model	Specifications	Int.	Ext.
1.2 GB	ST31200N	3.5" Law Profile 10ms	$875	$935
1.2 GB	ST 11200N	3.5" 10ms	$875	$935
1.9 GB Barracuda	ST 11950N	3.5" 8ms	1535	1595
2.4 GB	ST 12400N	3.5" 9ms	1585	1645
2.4 GB Barracuda II	ST 12550N	3.5" 8ms	1745	1805
2.1 GB Elite 2	ST 42400N	5.25" 11ms	1725	1825
3.4 GB Elite 3	ST 43400N	5.25" 11ms	2145	2245

All Seagate drives came with a 5 year factary warranty and are backed by a 30 day maney back guarantee.

TAPE BACKUP DRIVES

Capacity			Int.	Ext.
2.0 GB	HP35470A	4mm	$1025	$1045
3-5 GB	HP35480A	4mm	1199	1219
2-5 GB	Exabyte 8205	8mm	1599	1625
5-10 GB	Exabyte 8505	8mm	2549	2569
20-50 GB	Exabyte 10i Auta Tape Loader			CALL!
90 Meter HP Tapes				$21
120 Meter Exabyte Tapes				$21

Pradirect tape backup systems include Retraspect v 2.0 backup saftware. Drives came with media.

EXTERNAL CABINETS

ZERO FOOTPRINT $75
40 watt shielded power supply, 110/220 VAC. Works with all 3.5" and 5.25" HH Drives.

MICROCAB Vertical Standing $89
110/220 VAC. Works with any 3.5" Drive.

FULL HEIGHT $139
68 watt shielded power supply, 110/220 VAC. Works with all 5.25" Drives.

19" RACKMOUNT $CALL
Twa, Faur, Six, and Eight Bay Cabinets available. CALL FOR QUOTE All cabinets came with a 25-50 pin Mac system cable. One year warranty an all cabinets

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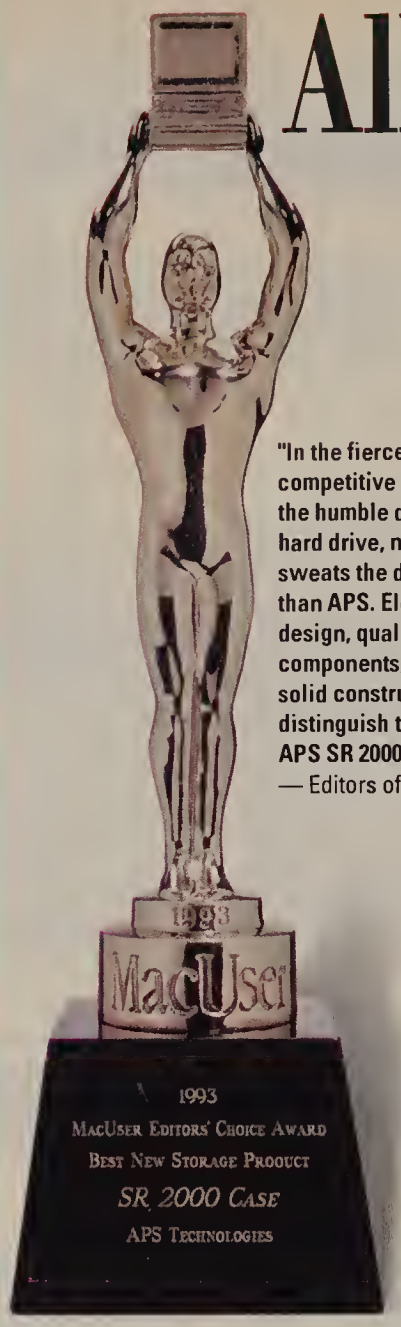
Circle 135 on reader service card

OPEN 7 Days a Week

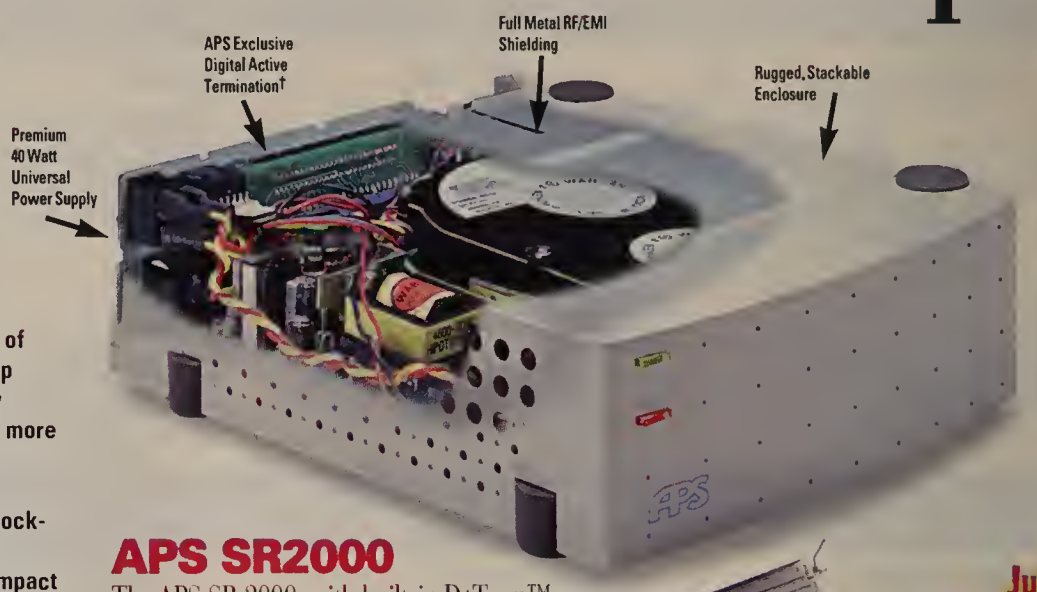
Priceless Support!

Great Products.

All Drives Are Not Equal.



"In the fiercely competitive world of the humble desktop hard drive, nobody sweats the details more than APS. Elegant design, quality components, and rock-solid construction distinguish the compact APS SR 2000 Case."
— Editors of MacUser



APS SR2000

The APS SR 2000, with built-in DATerm™, can stop "SCSI Voodoo" with its IC controlled, digital active termination. DATerm's patent-pending technology eliminates SCSI line pulse fluctuations, as well as confusing signal and voltage reflections. Its unique impedance-matching characteristics provide superior signal-to-noise ratios. DATerm decreases SCSI retries, allows more reliable data transmission and improves SCSI chain stability. The SR 2000 is the best external 3.5" drive enclosure available on the market today.

SR 2000 StacKIT™ $24

- End Cable Bondage Forever!
- Minimize SCSI Chain Length
- Heavy Metal Shielding Protects SCSI Signal
- StacKIT Includes Four Concave Stacking Feet
- StacKIT Includes Exclusive APS SCSI C "Connector"





Just $99

SCSI Sentry™

Now you can "stop SCSI Voodoo" on your SCSI Chain, even when you're not ready to buy a new drive. Our new SCSI Sentry™ gives you all the benefits of APS' acclaimed DATerm technology in the form of an external SCSI performance monitoring instrument.

Benefits	SCSI Sentry
Optimizes Overall SCSI Performance	✓
Exclusive Digital Active Termination	✓
Provides Ideal Termination Power	✓
Drastically Reduces SCSI Retries	✓
Regulates SCSI Line Voltage	✓
Solves Bus Impedance Issues	✓
LED Activity Indicators Diagnostic Tool	✓
Easy Installation: Takes Seconds	✓

APS HARD DRIVES

122MB - 257MB

Model	Capacity	Internal	SR2000
APS Q 127[2] Quantum 127 mechanism	122MB	$189	$279
APS Q 170[2] Quantum 170 ELS mechanism	163MB	199	289
APS MX 240[2] Maxtor 7245 mechanism	234MB	259	349
APS Q 270[2] Quantum LPS270 mechanism	257MB	269	359

• Internal drives for Quadra 800 and Centris 610 available.

324MB - 1029MB

Model	Capacity	Internal	SR2000
APS MX 345[2] Maxtor 7345 mechanism	324MB	$379	$469
APS 340[2] 340 mechanism	327MB	299	389
APS Q 540[2] Quantum 540 mechanism	516MB	529	619
APS MS1.2AV[5] Micropolis 2210AV mechanism	965MB	999	1089
APS MS1.2[5] Micropolis 2210 mechanism	1001MB	899	989
APS MS4110[5] Micropolis 2210 mechanism	1002MB	999	1089
APS Q 1080[5] Quantum 1080S mechanism	1029MB	859	949

** Internal Price Listing*

1611MB - 2845MB

Model	Capacity	Internal	SR2000
APS ST 1.6[5] Seagate ST11950 Barracuda mech.	1611MB	$1499	$1589
APS MS 1.7AV[5] Micropolis 2217AV mechanism	1612MB	1399	1489
APS MS 1.7[5] Micropolis 2217S mechanism	1682MB	1299	1389
APS ST 2.0[5] Seagate ST 125500N Barracuda mech.	2040MB	1869	1959
APS MS 2.4G[5] Micropolis 1926 mechanism	2100MB	1599 ✦	1699
APS MS 3.0G[5] Micropolis 1936 mechanism	2845MB	2249 ✦	2349

1-5 Denotes length of manufacturer's warranty
✦ External Case is Special Full Height Only

POWERBOOK DRIVES

Model	Capacity	LW Pro 630	Internal	Companion II AC/DC
APS PB 85[1]	80MB	$249	—	—
APS PB 170[1]	160MB	349	$299	$439
APS T 213[1]	202MB	409	359	499
APS PB 250[1]	240MB	449	399	539
APS T 340[1]	324MB	579	529	649
APS T 520[1]	500MB	949	899	1039

APS MS 1.2

The APS MS 1.2 provides the best mix of performance and price in its class. The 5400 RPM spindle speed of its Micropolis 2210 mechanism delivers spectacular sustained transfer rates and seek times averaging 9.1 ms.

$899*



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InfoFax: 1-800-374-5802



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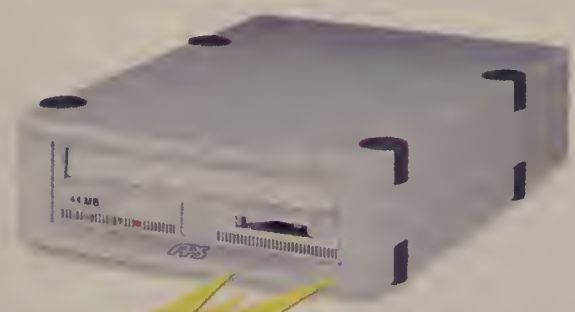
Only APS brings you SyQuest with all the benefits of the SR 2000 & Digital Active Termination

APS SQ 5110c & SQ 3105

These removable cartridge drives are based on SyQuest's award-winning removable cartridge mechanisms. Available in 5.25" 44 and 88MB and 3.5" 105 and 270MB configurations, only APS SyQuest drives give you the great performance and exceptional economy of a time-proven removable cartridge drive system in our award-winning SR 2000 enclosure with DATerm.

APS SQ 3105
$429





APS 44MB SQ555
$299

SYQUEST		
APS SQ 555[2]	44MB	$299
APS SQ 5110c[2]	44/88MB†	459
APS SQ 3105[1]	105MB	429
APS SQ 3270[1]	270MB	659

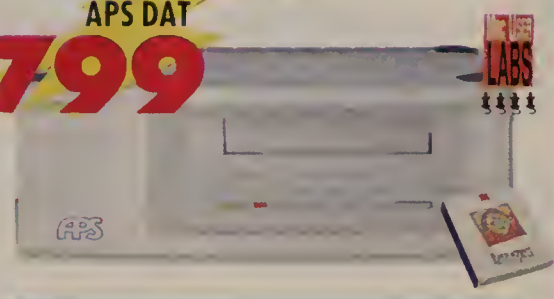
† Does not format 44MB cartridges
44MB cartridges — $65 unformatted, $70 formatted
88MB cartridges — $100 unformatted, $105 formatted
105MB cartridges — $59 unformatted, $64 formatted
270MB cartridges — $95 unformatted, $100 formatted
All SyQuest Drives Include 1 FREE Cartridge



1993/94 Macworld Magazine World Class Award - APS Hard Drive Series Readers' Choice



APS DAT
$799



THE APS ADVANTAGE

- 30-Day MBG
- Toll-Free Support
- Awesome Warranties
- Factory Direct Quality
- Rapid Repair Return
- 24-Hour Product InfoFax

CD ROM BUNDLE

Model	Without Bundle	B.Y.O.B.*
APS T 3401	$499	$399

*Build your own bundle! Buy any 6 CDs from our full line of CD titles and you can get the fastest CD ROM drive available - the APS T 3401 - for only $399.
Call our 24-hour InfoFax line today to receive a complete list of CD titles. Call 1-800-374-5802 and request document ID# 6001

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MAGNETO OPTICAL

Model	Internal*	SR 2000
APS 128MB MO[1]	$769	$799

Mechanism is Epson Magneto-Optical OMD-5010
All MO Drives Include 1 FREE Cartridge
128 MO cartridge — $49 unformatted, $55 formatted

TAPE DRIVES

APS T 155 MB Tape Backup❖ $479
155MB Backup Tapes – $19, 10 Pack $170
❖*Only Available in ZFP Case.*

POWERBOOK STUFF

APS SCSI DOC w/PowerMerge $39
Palm-Sized 25–30 PowerBook SCSI Adapter that includes a docking adapter for PowerBook and termination power indicator. Receive Power-Merge Lite Free with every APS SCSI DOC!

APS SCSI BOY $29
Rugged Palm-Sized 25–30 PowerBook SCSI Adapters

APS PowerBalls $9.99ea.
Brighten up that dull granite with a colorful APS PowerBall. Manufactured to the same exacting specifications as the Apple original, the APS PowerBall lets you customize your PowerBook® environment.



APS PowerBalls

DAT

Model	Capacity*	Internal	SR 2000
APS DAT[2]	1.8-2G on 90m tape	$749	$799
APS ProDAT[2]	4-5G on 90m tape	949	999
APS Turbo DAT[2]	4-5G on 90m tape	1149	1199
APS HyperDAT[1]	8-10G on 120m tape	1449	1499

Actual data compression and tape capacity vary greatly depending on the type of data recorded, other system parameters and environment.
60 meter DAT Tape – $12, 10 Pack – $110
90 meter DAT Tape – $16, 10 Pack – $130
120 meter DAT Tape – $35, 10 Pack – $300
All APS DAT Drives Include Retrospect by Dantz & 1 FREE DAT Tape

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Great Products. Priceless Support!

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Quantum



ClubMac 30 DAY MONEY BACK GUARANTEE

A ClubMac Quantum Drive is the best "plug-and-play" storage solution for your Macintosh computer. All Quantum drives are backed by ClubMac's 30-Day Money Back Guarantee and TWO Year Warranty (Go•Drives include ONE Year Warranty).

GO•DRIVE SERIES

2.5" POWERBOOK DRIVES

Capacity	Access	Internal	External
85mb	17ms	$199	$319
127mb	17ms	$235	$355
170mb	17ms	$259	$379
256mb	17ms	$339	$459

External Go•Drives came in battery powered case as shown

QUANTUM DRIVES

3.5" LOW PROFILE, LOW POWER

Capacity	Access	Internal	External
170mb	17ms	$185	$245

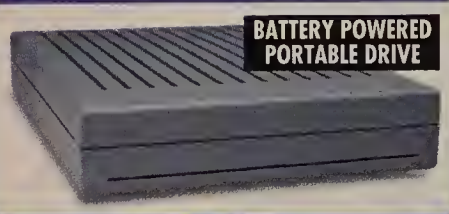
3.5" LOW PROFILE

240mb	11ms	$239	$299
340mb	11ms	$289	$349
540mb	10ms	$479	$539
1080mb	11ms	$829	$889

3.5" HALF HEIGHT

1800mb	10ms	$1099	$1159

POWERBOOK DRIVES



GO•DRIVE SERIES
The Quantum Go•Drive Series are fast, lightweight, advanced 2.5-inch hard disk drives. Go•Drives are perfect for use with Apple PowerBooks with available capacities from 85MB to 256MB.

ELS, LPS AND PRODRIVE SERIES
The Quantum 3.5-inch hard disk drives are the optimal storage solution for entry level Macintosh systems to arrays of high-end workstations and network file servers. Available capacities from 127mb up to 1800mb. Quantum drives offer average seek times at low as 10ms, transfer rates up to 10 MB/sec, and SCSI-1/SCSI-2 interface. Performance enhancements include Quantum's Proprietary DisCache and WriteCache firmware.

FUJITSU

ClubMac 30 DAY MONEY BACK GUARANTEE

FIVE YEAR WARRANTY



Unformatted Capacity	Model	Description	Access Time	Actual MAC Capacity	Internal	External
520mb	M2624	3.5" Half Height	9ms	496mb	$489	$549
1.2GIG	M2694	3.5" Half Height	8.5ms	995mb	$899	$959
2.4GIG	M2654	5.25" Full Height	11.5ms	2000mb	$1389	$1489



Seagate

ClubMac 30 DAY MONEY BACK GUARANTEE

Seagate 5.25-inch full height drives are available in capacities ranging from 1.6 gigabytes to 3.4 gigabytes. These drives feature and ave. seek time as low as 11ms, 256KB cache buffer, rotational speed up to 5,400 RPM, SCSI-2 interface, 200,000 hour MTBF and ONE Year Warranty

Unformatted Capacity	Model	Description	Access Time	Actual MAC Capacity	Internal	External
3.5" LOW PROFILE						
1.2GIG	ST31200N		10ms	1000mb	$889	$949
3.5" HALF HEIGHT						
1.2GIG	ST11200N		10.5ms	1000mb	$869	$929
1.9GIG	ST11900N		9ms	1600mb	$1199	$1259
2.4GIG	ST12400N		9ms	2000mb	$1599	$1659
1.9GIG	ST11950N	*Barracuda 1*	8ms	1650mb	$1549	$1609
2.4GIG	ST12550N	*Barracuda 2*	8ms	2050mb	$1829	$1889
5.25" FULL HEIGHT						
2.4GIG	ST42400N	*Elite-2*	11ms	2050mb	$1739	$1839
3.4GIG	ST43400N	*Elite-3*	11ms	2750mb	$2159	$2259

FEATURING

SyQuest® REMOVABLE TECHNOLOGY

ClubMac 30 DAY MONEY BACK GUARANTEE



	Internal	External
ClubMac 44mb	$259	$299
ClubMac 88c	$385	$425
ClubMac 105mb	$359	$399
ClubMac 270mb	$619	$659

CARTRIDGES

44mb/105mb	$59
88mb	$89
270mb	$99

3.5" DUAL REMOVABLES

Dual 105mb	$729
Dual 270mb	$1179
Dual Combo 105/270*	$1029

5.25" DUAL REMOVABLES

Dual 44mb	$549
Dual 88c	$649
Dual Combo 44/88c*	$729

* Dual Combos come with both types of media

All SyQuest drives include a TWO Year Warranty, SCSI Director formatting software, and necessary cables for "plug-and-play". All SyQuest cartridges cartridges include a ONE Year Warranty.

DAT BACKUP by CLUBMAC

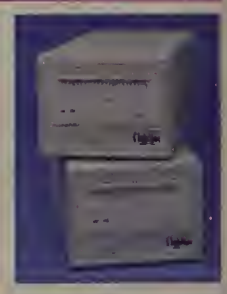
CLUBMAC DAT *DDS & DDS-DC DRIVES*

provide up to 5.0 gigabytes of cost effective and highly reliable data storage on a pocket size Digital Audio Tape (DAT) cassette. Available in 2 models: ClubMac DAT using the DDS tape format and the ClubMac DAT/DC with the efficient DDS-DC compression format. They are ideal for hard disk backup, archival storage, data file distribution.

- 20 sec average data access time (60m tape)
- 14mb/min backup rate, 180KB/sec transfer rate
- MTBF of 60,000 hours • TWO Year Warranty
- Includes RetroSpect v.2.0 BackUp Software and ONE 90m Tape Cassette



FREE
RETROSPECT V2.0 BACKUP SOFTWARE ($139 VALUE)



Capacity	Model	Format	Media	Internal	External
2.0GIG	ClubMac DAT	DDS	60m, 90m	$749	$799
2-4GIG	ClubMac DAT/DC	DDS-DC	60m, 90m	$999	$1049

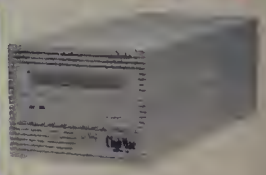
CLUBMAC DAT/2 *DDS-2 DRIVE*

provides up to 8.0 gigabytes of high performance, cost effective and reliable data storage on a pocket size Digital Audio Tape (DAT) cassette. The ClubMac DAT/2 has a significant number of key features which make it adaptable to a wide range of user environments and system applications, including:

- 20 sec average data access time (60m tape)
- 28mb/min backup rate, 366KB/sec transfer rate
- MTBF of 180,000 hours
- ONE Year Warranty
- Includes Retrospect Remote v.2.0 (3 pack) Network Backup Software and ONE 120m Tape Cassette



FREE
RETROSPECT REMOTE V2.0 BACKUP SOFTWARE ($249 VALUE)



4-8GIG	ClubMac DAT/2	DDS-2	60m, 90m, 120m	$1329	$1379

Verbatim MEDIA PRODUCTS

DAT TAPES	ea	10 pack
4mm (60m)	$12	$110
4mm (90m)	$15	$125
4mm (120m)	$25	$225

OPTICAL MEDIA	
3.5" 128mb	$35
5.25" 594mb/652mb	$89
5.25" 1.2GIG/1.3GIG	$115

CLUBMAC OPTICAL DRIVES



CLUBMAC 3.5" 128MB OPTICAL

"Low price and all-around value characterize this 128mb rewritable drive."
-Macworld Editors' Choice December 1993



CLUBMAC 5.25" 650MB OPTICAL

"Without question the best bargain among 5.25" drives."
-Macworld Editors' Choice December 1993

	Internal	External
ClubMac 3.5" 128mb Fujitsu Optical (M2511A)	$839	$869
Fujitsu 3.5" 128mb Dynamo		$869
ClubMac 3.5" 128mb Epson Optical	$759	$789
ClubMac 5.25" 650mb Sharp Optical	$1669	$1699
Hewlett-Packard 5.25" 1.3GIG Optical External		$2699

ClubMac 30 DAY MONEY BACK GUARANTEE

MACWORLD MW EDITORS' CHOICE

All ClubMac Opticals include ONE cartridge and ONE Year Warranty.



E-Machines T16 II

- 640 x 480 up to 1024 x 768
- Comp. with on-board graphics on the Quadra and Centris

MacUser Magazine
January 1993

E-MACHINES

E-MACHINES MONITORS

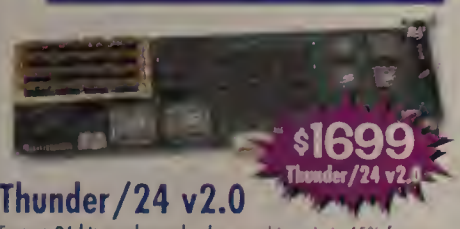
ColorPage T16II	$1139
E-Machines E20 Dual Mode Color	$1589
E-Machines T20 Multi-Mode Color	$2429

E-MACHINES GRAPHIC CARDS

24-8it Futura II SX / LX	$419/775
24-8it Ultura LX	$1089
Simply TV	$389

SUPERMAC

FREE DSP UPGRADE*



Thunder/24 v2.0

Fastest 24-bit accelerated color graphics. It is 45% faster. Provides high performance QuickDraw acceleration on 12-21" displays at resolutions from 512 x 384 to 1152 x 870 pixels.

24-BIT GRAPHIC ACCELERATORS

Thunder/24 v.2.0"(G1130)	$1699
Spectrum Power • 1152 (G3430)	$1189
Spectrum/24 Series IV (G2230	$799
ThunderStorm (G2930)	$429

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SuperMatch Hi-Res 20 Trin (STD9745)	$2679
SuperMatch 20•T XL (STD9752-XL)	$2499
Plotinum 21 Two-Page GS (STD9761)	$999
Plotinum 21 Full Page GS (STD9725)	$839

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Videa Spigat Nu8us (DV1030)	$369
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Paint8oard Professionol Starting at	$1799
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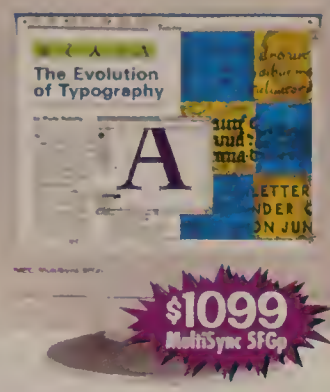
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MW EDITORS' CHOICE
October 1993
NEC MultiSync 5FGp





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Silentwriter 1097 (10ppm, up to 600 dpi, PS Level 2)	$1379

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	HP DeskWriter 310 (with Cutsheet Feeder (60-sheet), Optional Color Kit Available)	$369
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MacWorld May 1994

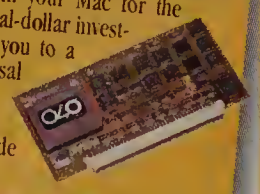
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UTI 0423



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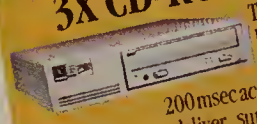
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GRA 0435
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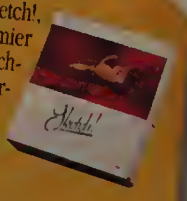
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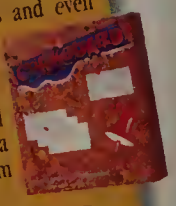
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GRA 0696
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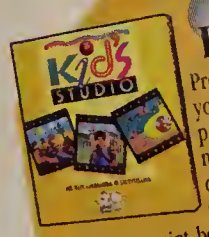
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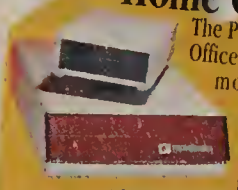
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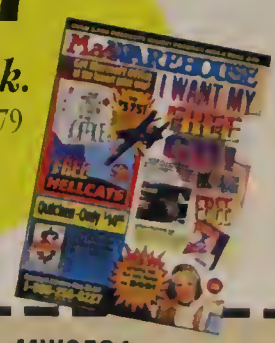
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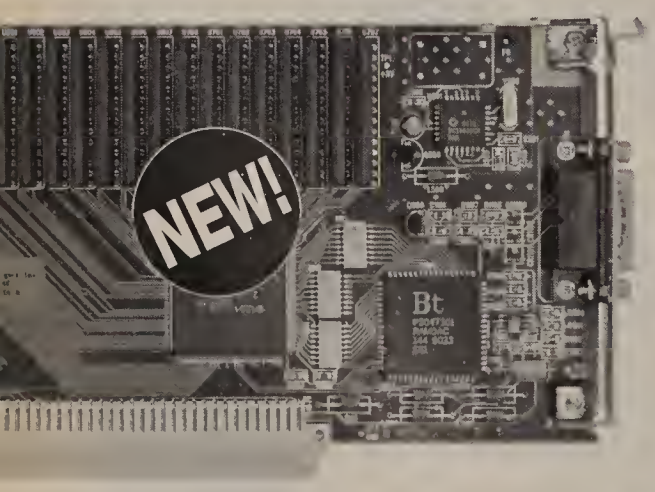
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170MB	3.5" LP 17ms	$180	$240
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270MB	3.5" LP 10ms	$275	$335
340MB	3.5" LP 10ms	$285	$345
540MB	3.5" LP 10ms	$475	$535
1000MB	3.5" HH 10ms	$885	$945
1200MB	3.5" HH 10ms	$995	$1,055
1800MB	***3.5" HH 10ms***	***$1,155***	***$1,215***

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Capacity	Description	Internal	External
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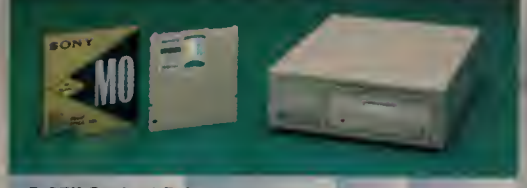
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Archive Viper 250	250MB`	3.5"HH	$499
Archive Viper 525	500MB	3.5"HH	$699
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MaxOptix-Tahiti II/III	594/650/1gb	25ms	$2,599/3,199
PLI 650/1.3GB	594/650/1.3GB		$1,699/2,999
PMO-650	594/650mb	19*ms	$2,599
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Q650 8/270	17"Monitor, X Keyboard	$2 789
Q650 8/270-CD	14"Monitor, X Keyboard	$2 889
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PRODUCT INDEX

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PRODUCT INDEX

Category	Page No.
ACCESSORIES	**237**
Cases	
Covers	
Diskettes	
Furniture	
Security Systems	
Serial Switches	
Trackballs	
PowerBook	
BUSINESS TOOLS	**222-224**
Bar Code	
Credit Authorization	
Point of Sale	
Property Management	
Foreign Language Translation	
EDUCATIONAL & RECREATIONAL	**237-238**
Astrology	
Astronomy	
Discount Software	
Flashcards	
Games	
Genealogy	
Grading	
Lottery	
Music	
On-Line Services	
Religion	
GRAPHICS	**240-241**
3D	
CAD/CAM	
Clip Art	
Fonts	
Graphics Translators	
MOBILE COMPUTING & PDA's	**236**
Battery Charger	
PowerBook Accessories	
Security	
Supplies	
MULTIMEDIA & CD-ROM	**239-240**
Presentation	
NETWORKING & COMMUNICATIONS	**236**
BBS	
Printer Interface	
PROGRAMMING & UTILITIES	**242**
Languages	
SERVICES & SUPPLIES	**241-242**
CAD/CAM	
Computer Insurance	
Computer Repair	
Consulting	
Data Recovery	
On-Line Services	
SERVICES & SUPPLIES (continued)	
Printer Supplies	
Slides	
SPECIALIZED MARKETS	**242**
Languages	
Manufacturing	
Medical	
Real Estate	
Shareware	
SYSTEMS & PERIPHERALS	**224-230**
UPGRADES & MEMORY	**231-236**

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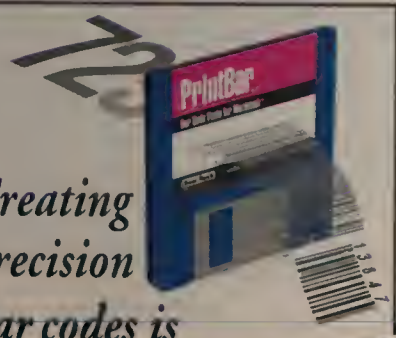
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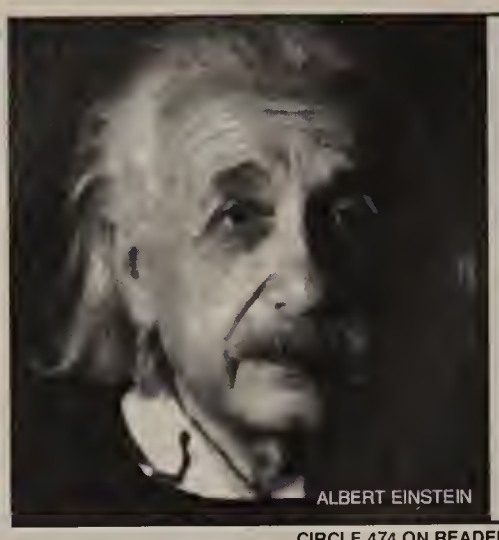
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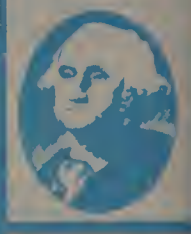
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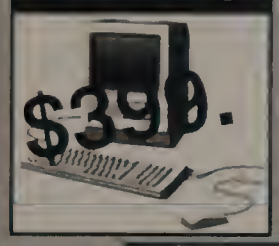
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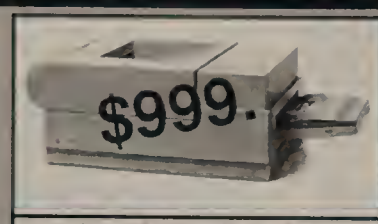
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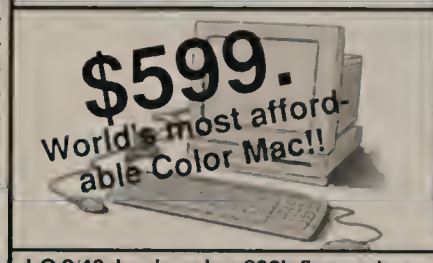
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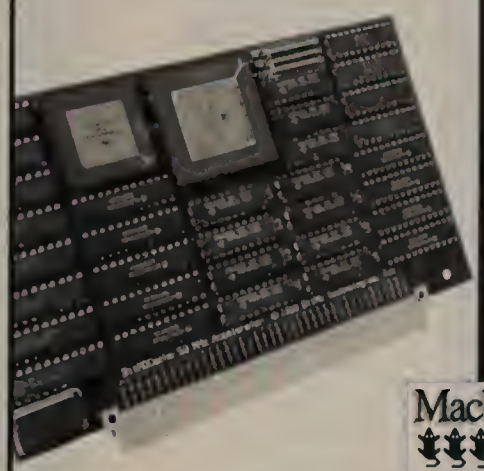
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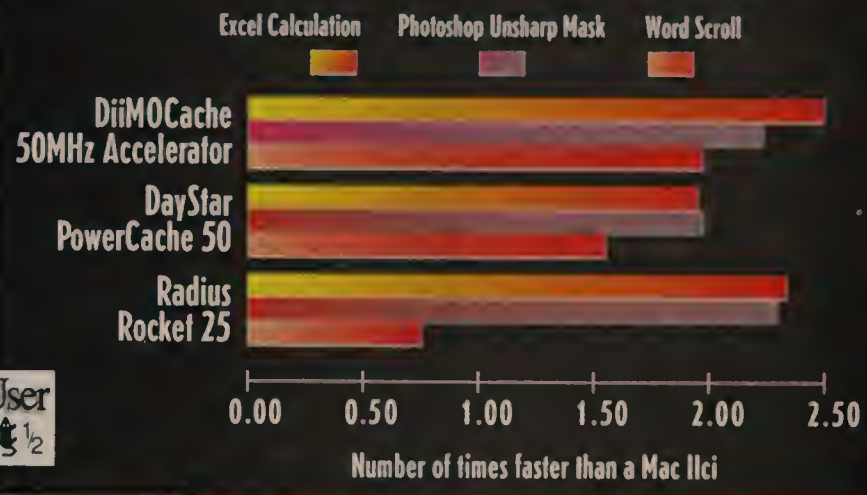
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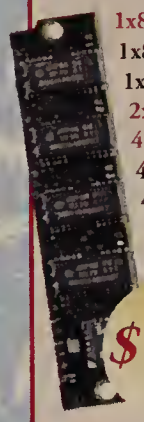
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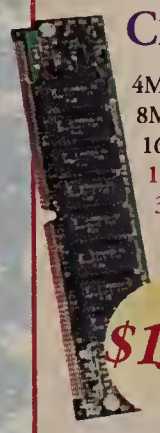
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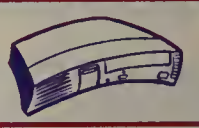


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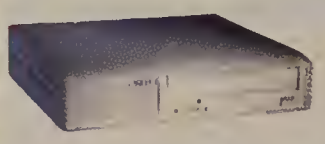
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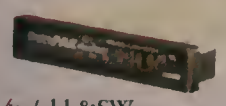
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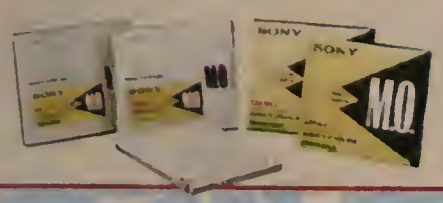
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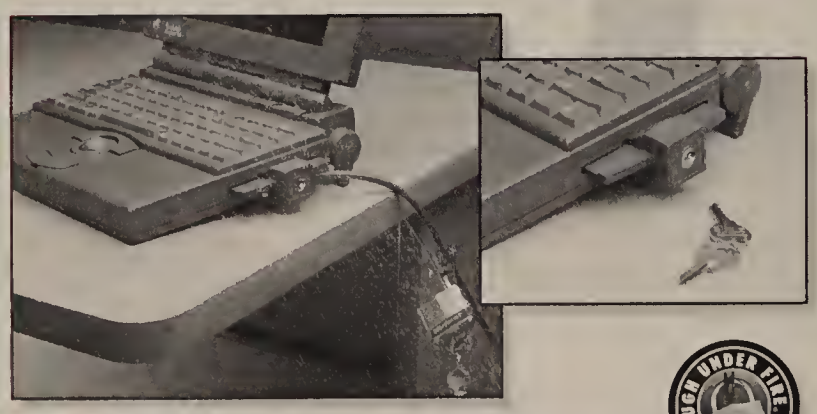
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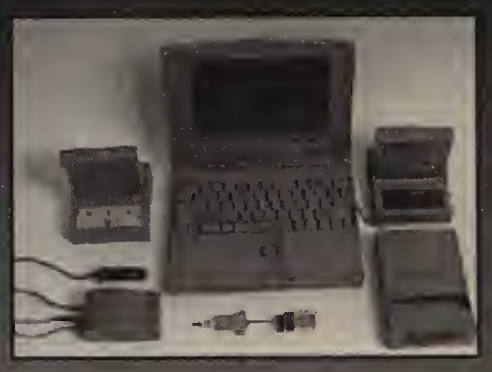
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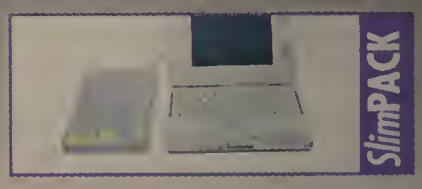
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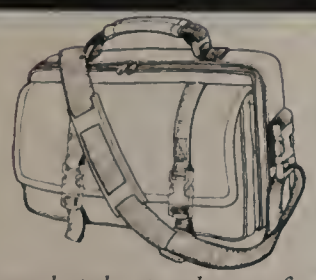
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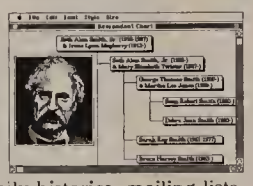
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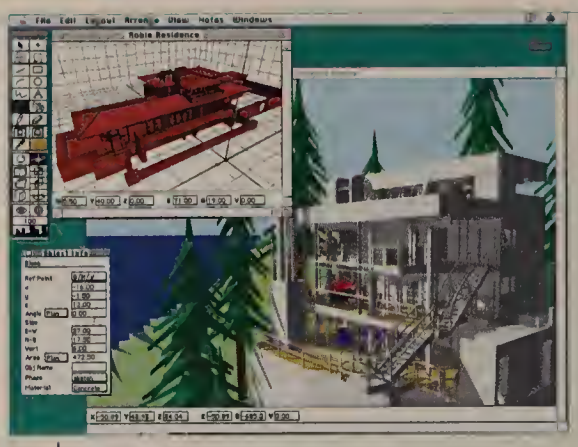
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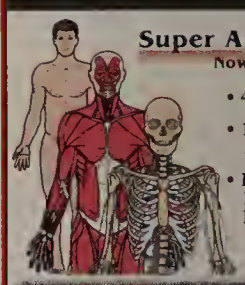
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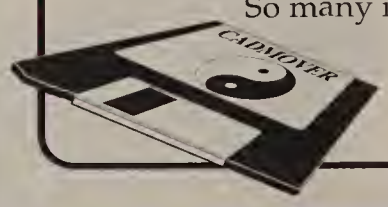
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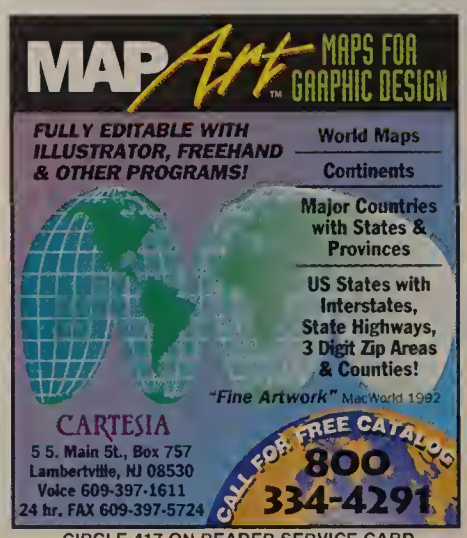
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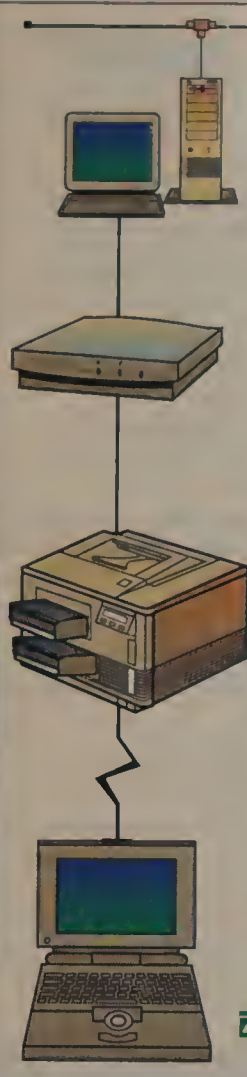
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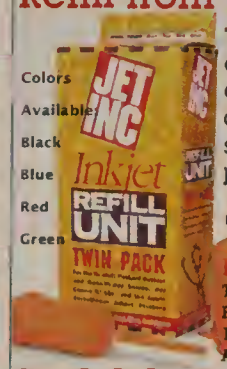
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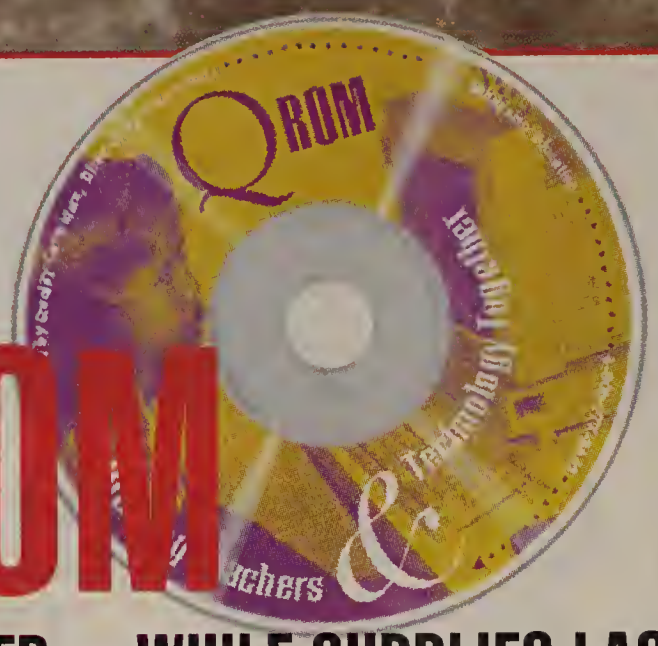
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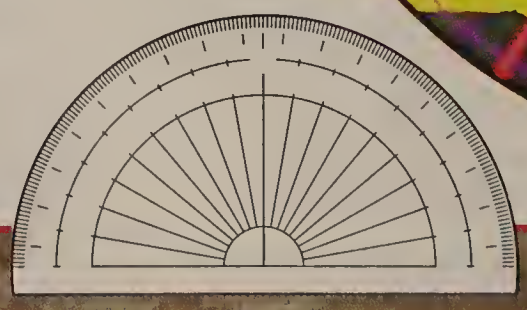
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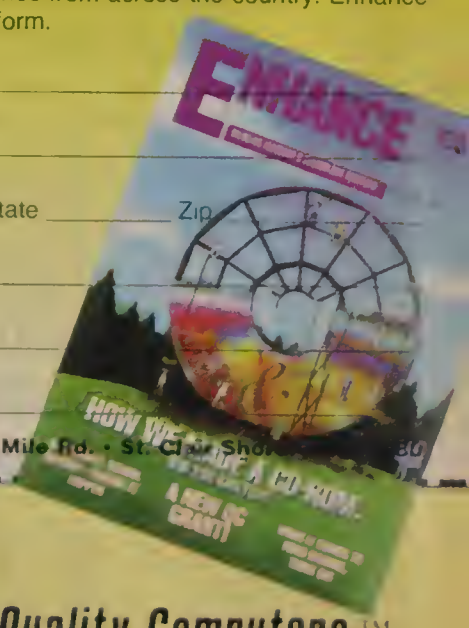
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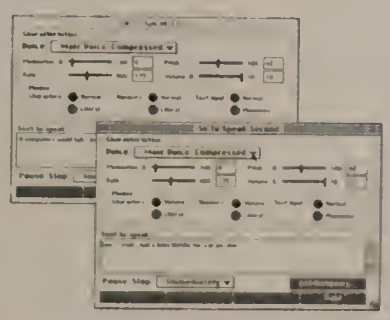
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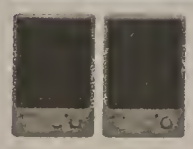
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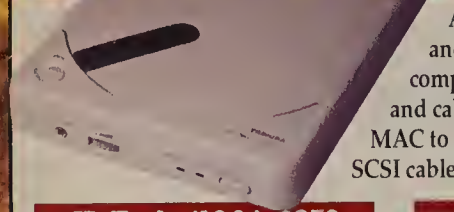
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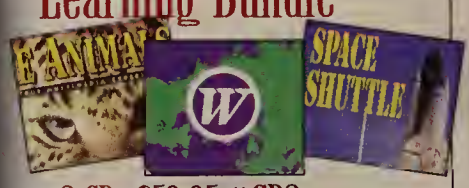
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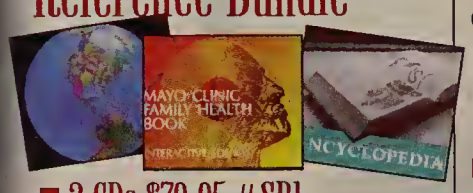
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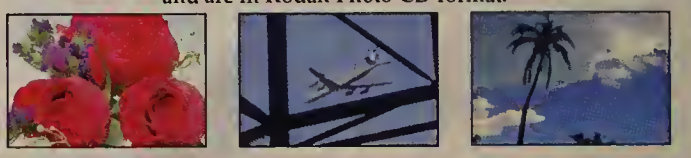
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WISE GUY

BY GUY KAWASAKI

The Macintosh Father

What to expect when your spouse is expecting

THIS COLUMN DOESN'T BASH Apple or John Sculley. It doesn't explain how to start a Macintosh software company or successfully cash out of one. It is intended for a broader audience than is a comparison of a Quadra 800 and an F-15. It is about the ramifications of a Macintosh owner becoming a father. A Macintosh man's greatest fear about pregnancy is that he won't be able to play with his Macintosh three hours every night. Instead, he thinks he'll be waiting hand and foot on his wife when she requests chocolate-covered tuna sandwiches, back rubs, or airsickness bags.

Macintosh Quality Time

In actuality, you are able to work longer than anytime during your marriage because your wife is asleep by 7:30 p.m. (People who sent me E-mail during the nine-month period between December 1992 and September 1993 may have noticed my near-instantaneous responses.) If you want to understand why your wife is so tired, strap a 25-pound bowling ball to your stomach for a few days.

Classes on new parenting, infant safety, and lactation begin around the sixth month of pregnancy, and Macintosh quality time quickly declines. These classes are equivalent to seminars that teach how to set up a Macintosh and use a mouse. And as with those seminars, you soon ask yourself why you ever had to *learn* to do simple things like change a diaper.

If you're a really supportive husband, you accompany your wife on her ob/gyn visits every week. I know, you never asked your wife to come with you when you were shopping for a Macintosh or when you had to take it back to the dealer, so why should you have to go with her to the doctor? You may not buy the software I endorse, but trust me on this: shut up and go. There are two reasons: first, both of you are responsible for the life of your child; second, you'll be able to make cool QuickTime movies with the video of the ultrasound.

Around the seventh month, nesting begins. Remember the care you took to prepare your Macintosh work space? A good desk, a comfortable chair, LocalTalk cabling, a mouse pad, the *perfectly* configured screen saver. Remember saying, "Honey, I need this special chair with an adjustable lumbar support so I can work longer and make more money by writing more columns"?

What comes around goes around. Now you hear, "Honey, we need to create a supportive and stimulating environment for our child." This means buying sleepy suits, bathtubs, pails, hooks, rattles, and strollers. A good rule of thumb is one stroller for each Mac you own. *The Right Start* catalog replaces the *MacWarehouse* catalog—and you spend more on baby



stuff than you ever did on software. Your wife buys twice as many baby books as you have Macintosh books, and *What to Expect When You're Expecting* replaces *Inside Macintosh* as your most-used reference.

The Ultimate Multimedia Machine

Delivery is a miracle. One cannot doubt the existence of God if you've seen a baby delivered (or, for that matter, tried to explain how Apple continues to survive). An hour after delivery, the reality that you are now the proud owner of the ultimate multimedia machine sinks in. Your new computer has color, sound, and several forms of output. It is WYSIWYG: What You Smell Is What You Get.

Being a parent means making things work any way you can. Remember when you first got a Macintosh and everything had to be just right? You'd spend hours figuring out which two INITs conflicted. You were a man of principle: This is how a Macintosh should work. Then you adopted a more pragmatic approach: As long as my Macintosh isn't crashing, I'm happy.

The same pragmatic approach develops with a baby: As long as the baby isn't crying, I'm happy. Principles go out the window. I went from "We'll buy cloth diapers, and I'll wash them" to "Let's use a diaper service" to "Let's buy a case of Pampers, and I'll donate money to the Sierra Club" within one week. (Don't even think about sending letters to the editor about why using disposable diapers is a heinous crime.)

This pragmatic approach is necessary because, as with your Macintosh, the reason why a baby crashes is usually inexplicable. One day it's no big deal if the formula is warm. The next day it is. One day wet diapers don't matter. The next day they do. Some books say babies cry because it's the only way they communicate. This is like Apple saying your Macintosh crashes to let you know it's alive.

The Bottom Line

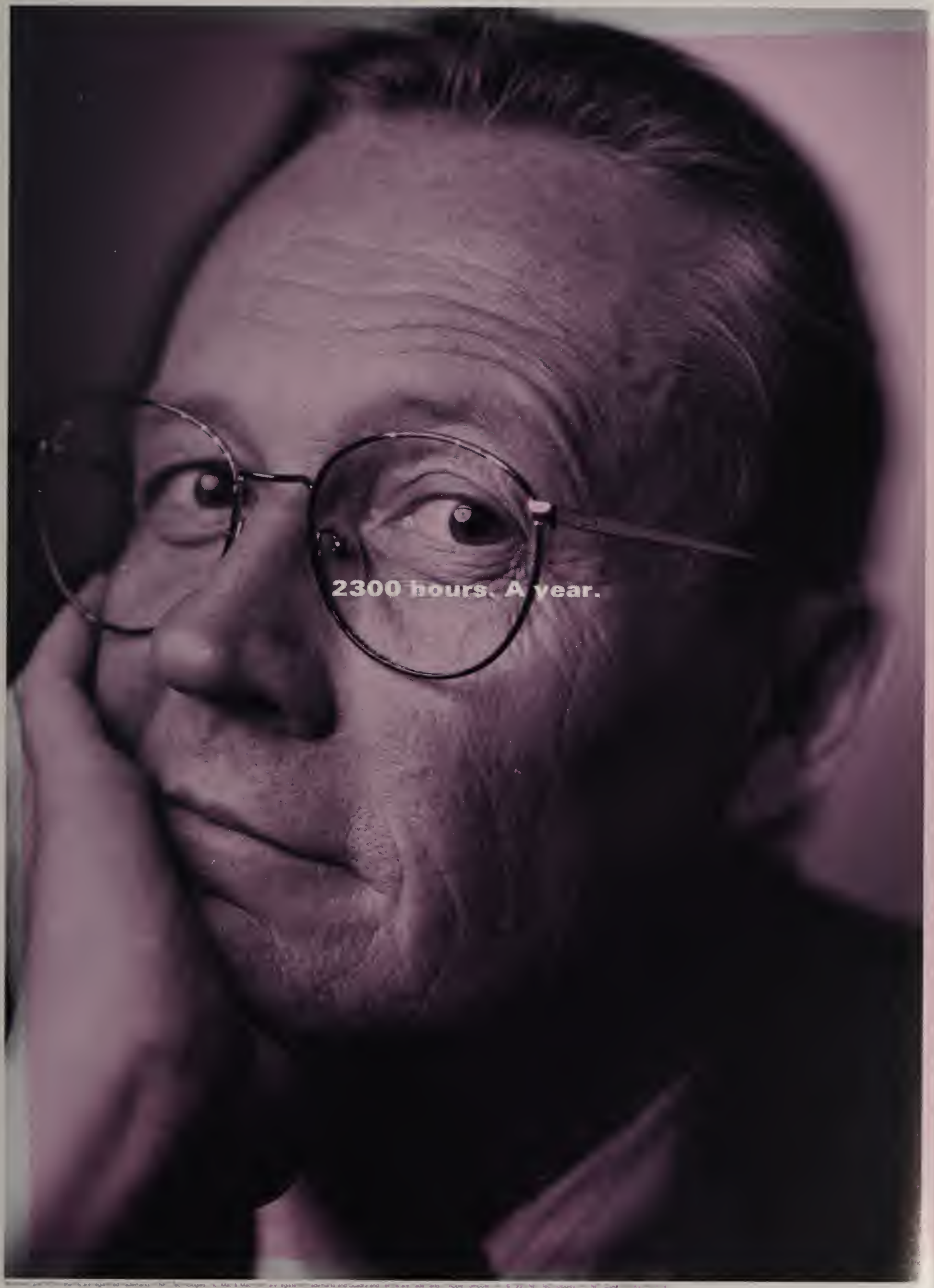
The bottom line of using a Macintosh is not the hassle of setting it up, dealing with Apple and software companies pointing the finger at each other, or wondering if you bought the right model. The bottom line is that a Macintosh is a source of wonder, hopes, and dreams.

If you were to ask parents about their newborns, they would say the same thing. **m**

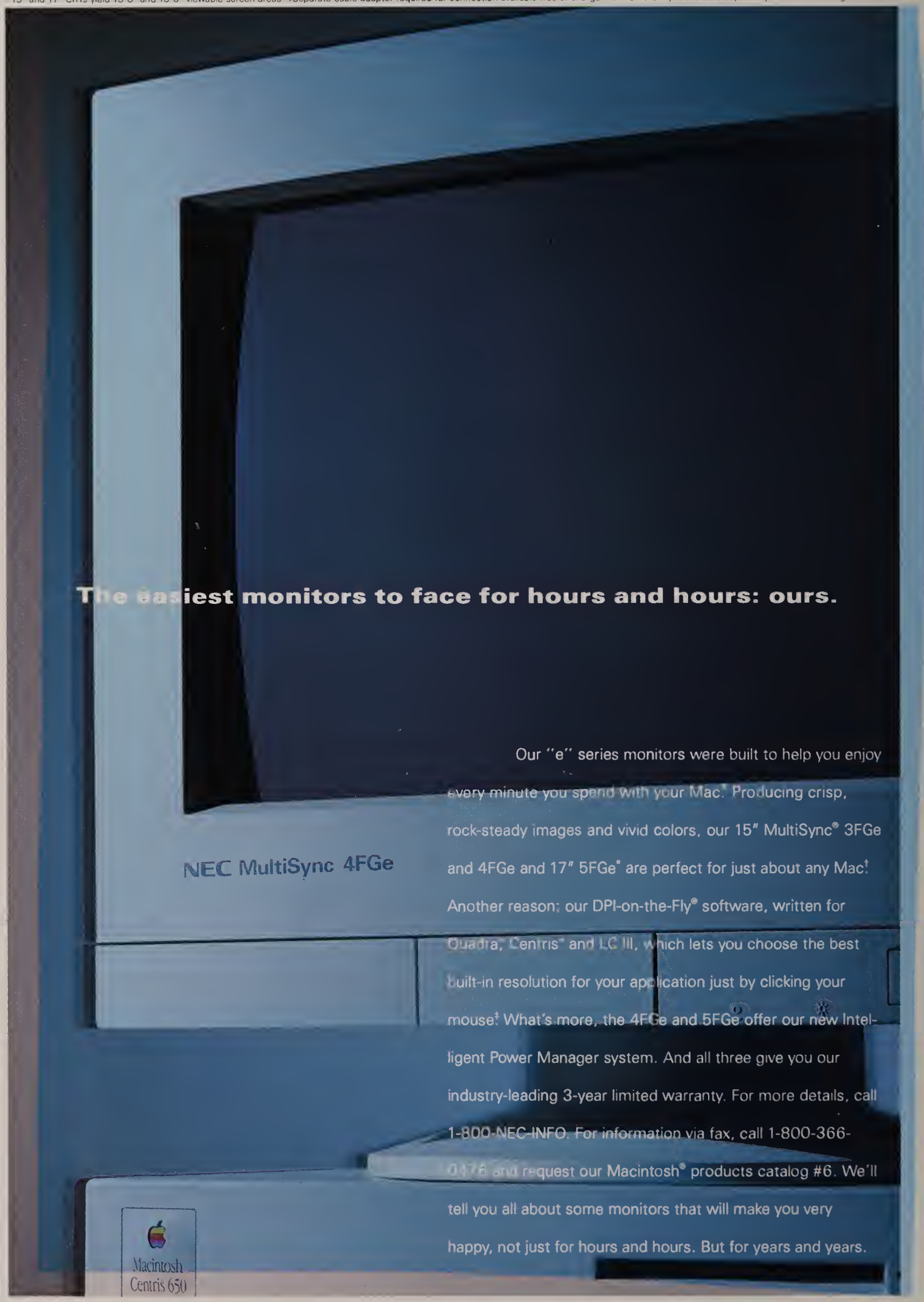
GUY KAWASAKI's views are his own and only sporadically represent those of *Macworld*. His latest book is *Hindsights* (Beyond Words Publishing, 1994). He has investments in Bit Jugglers, Global Village Communication, Bookmaker Corporation, and others. He can be reached at Kawasaki@radiomail.net.

JOHN HERSEY


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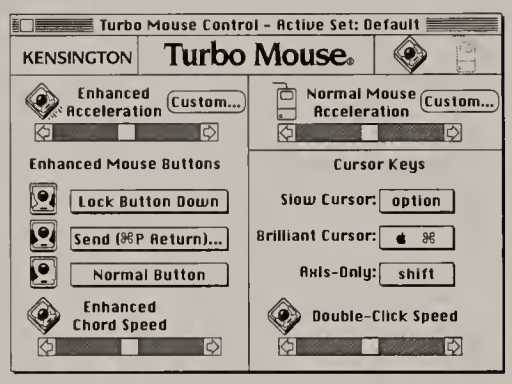
Comfort.

MacUser gave it the coveted Five Mice. The readers of *Macworld* voted it "Best Input Device" five times. It has won more awards than any Macintosh input device in history.

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Turbo Mouse is more comfortable than an ordinary mouse. Its superior trackball design



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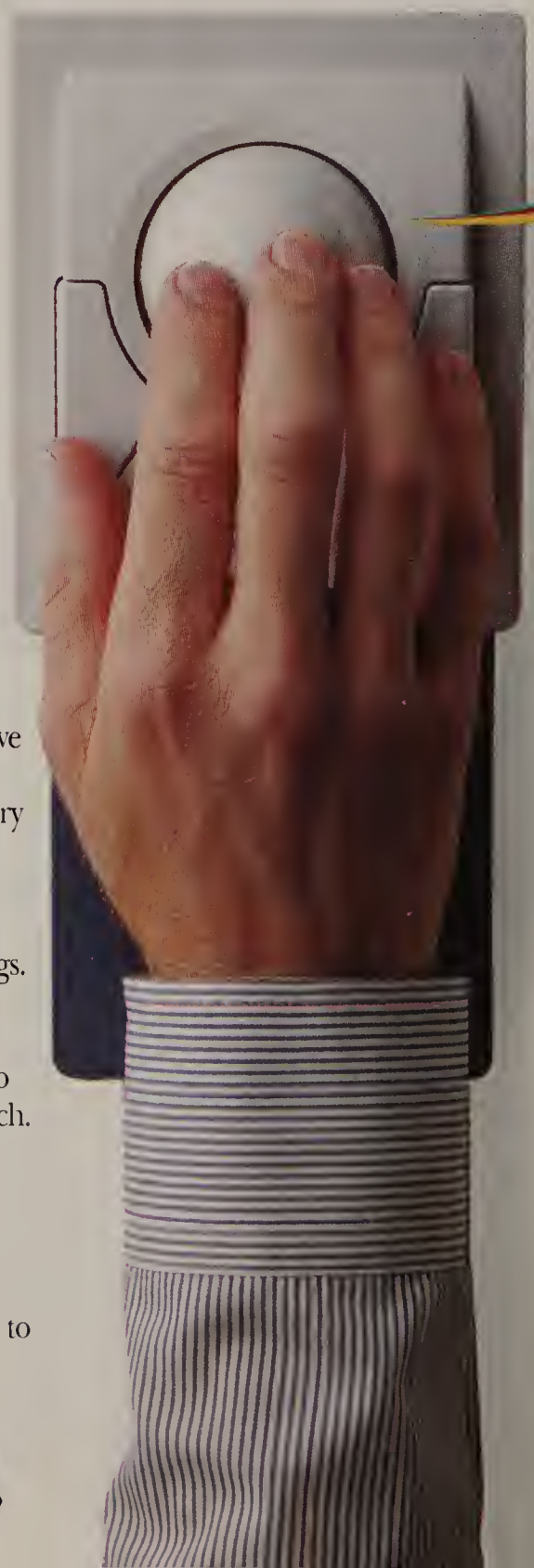
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